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GLEANINGS

A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS.

BEE CULTURE

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HONEY VINEGAR, according to an analysis reported in *Le Progres Apicole*, contained 19 per cent more acetic acid than vinegar from apple cider, and only 42 per cent as much alcohol.

THE BRITISH B. K. ASS'N has a scheme of insurance whereby a member by paying one penny per colony can be secured to the extent of \$150 against damage done by his bees to third parties.

THE *Centralverein fuer Maehren* complains that, out of the 11,000 bee-keepers of that region, only 2000 belong to the association. I doubt if two-elevenths of the bee-keepers in this country belong to the National.

FRAME-TONGS of different patterns have been in use in Germany for years, but never seem to have been popular in this country. But they are not needed for top-opening hives as they are for the side-opening hives used in Germany.

I THINK we may as well dismiss the uncomfortable fear that *Bacillus alvei* is identical with *Bacillus mesentericus*. Not a single bacteriologist, to my knowledge, has come to the support of Dr. Lambotte, and several have disputed his affirmation.

YOU ANTI-SALOON fellows in Ohio must be nearly bareheaded nowadays — hats all worn out with tossing in the air. [Our hats are on good and tight. We are not saying much, but are doing a good deal of thinking. See Homes in this issue.—ED.]

PREVENTION of swarms — Pincot's plan in *Apiculteur*: At the beginning of harvest, reduce each colony to four frames of brood, taking away the ripest brood. He says that, with this treatment, his bees do not swarm. I'm afraid it wouldn't work in all localities.

"A CHILDISH NOTION" is what Reidenbach calls the idea that formic acid is put into honey by the stings of the bees. In a brochure he says the acid is being continuously developed in brood-combs, exhaling as vapor from the empty cells vacated by the emerging young bees.

NEARLY takes one's breath away to find in a *German* bee-journal a protest against tobacco earnest enough to satisfy the heart of A. I. Root. The editor of *Imkerschule* says: "Tobacco-smoke injures bee-keeper and bees." Another man says: "Tobacco is poison, and neither does it belong in the mouth of the bee-keeper nor should its smoke be blown on the bees."

"CAN A LOCALITY be overstocked with bees?" The answer in *Leipz. Bztg.* is that, in most localities, an unlimited number would prosper. I don't know how it is with bees brought up in the German language; but a few thousand colonies of our bees would clean up all the nectar in the richest locality, and not have enough for their own use. [The language of our German cotemporary is pretty strong.—ED.]

RUBEROID is a new material for hive covers, now talked about in the German bee-journals. It is claimed to be inodorous, permanently elastic, not affected by heat or cold, a great non-conductor, and indestructible. Costs 20 cts. a square yard. [I have heard of this material before. If there is actual rubber in it, there will be a deterioration in time. It is sold in this country, but at what price I do not know. Methinks it is a Yankee invention.—ED.]

W. O. VICTOR, page 388, gives 8200 young bees emerging in about two days. That makes about 4000 eggs laid in a day. A certain editor once tried to make me believe that I couldn't argue the size of a colony from the amount of eggs laid, because a good part of the eggs didn't hatch. I'd like to sit down by that same editor and read about Victor's 4000 eggs a day, and then ask him, "Do you think all those 4000 eggs hatched?" [Look here, doctor. You have backed me into a hole before, and I acknowledged myself cornered. Why do

you now add insult to injury by firing more questions at me on this subject? No; I'll be like the woman who was "of the same opinion still."—Ed.]

G. J. YODER makes a profitable business "in cutting 45 2-lb. blocks and 18 $\frac{1}{2}$ -lb. out of a 60 pound can, leaving 4 pounds of odds and ends, p. 394. That makes 103 pounds from the 60-pound can. Didn't those wicked types make it 45 2-lb. where it should have been 45 1-lb? [You are right, doctor. The copy at first read "forty five lb. blocks." As that amount was either 45 or 200 as the reader might make it, it was changed to "45 1-lb. blocks." The compositor took the 1 for a 2, and on reading the copy to the proof reader the mistake was possibly repeated by the same person.—Ed.]

A STRAW, page 375, tells of removed bees staying where put after special treatment and a captivity of two hours, and you say, Mr. Editor, that bees will not stay put unless confined at least three days. But you ignore the *treatment* he gave them. Are you sure bees so treated need three days confinement? Others report that pounding on the hives and frightening the bees with smoke while imprisoned will make them stay after a few hours of confinement. Are you sure your bees so treated would need 3 days? [No, I am not quite sure; but I think many of them would go back if released in less than three days, even if they had been bumped and pounded as prescribed in the treatment above referred to. But we will test that matter (or I hope to) a little more carefully this summer.—Ed.]

"How Americans rear artificial queens" is the heading of an item in *Deutsche Imker*. "Americans frequently use wooden queen-cells (!)," and then is told how R. Rowsome had queens artificially fertilized in a carboy. "Jung-Klaus" dismisses the affair then as a foolish joke. The Germans are inclined to consider any thing done in America as not to be taken seriously, and the Americans return the compliment by complacently concluding they have nothing to learn from Germany. All of which is the foolishness of ignorance on both sides. [Americans have never accepted the theory that queens could be fertilized in a carboy; indeed, they are just as skeptical on that point as the Germans; but in the matter of wooden queen-cells, our friends of Teutonic extraction may have much to learn yet. They should not forget how they have clung to the old Dzierzon hive, and how gradually, now, some of the most progressive of them are working over to the Langstroth-Dadant principle.—Ed.]

THE ADVICE to begin with bees on a small scale, increasing numbers with experience, is excellent, but isn't it carrying it a little too far to say broadly that we must go no faster than the bees will pay the way? We don't always do that with other things; why with bees? I know it would have been bad for me if I had followed that rule. [Very likely; but when one is giving ad-

vice sometimes he is obliged to overdo it, in order that his pupils may not commit the folly of going too far. It is human nature, when one is all fired up with enthusiasm, such as one gets with an ordinary case of bee-fever, to plunge in debt too deeply. But say, doctor, I was expecting you to assail my article on this general subject of "keeping more bees" in several places. Anticipating that you or somebody else would, I prepared it with unusual care. Now, honor bright, doctor, it is highly important to know, in the case of the extracted-honey bee-keeper of fair executive ability, whether he could realize in a series of years the averages that I have mentioned if he attempted to run a thousand colonies. And while you are about it will you solve another little riddle? If such possibilities can be reached, how are you and I to know whether *we* are the chaps who are capable of running a thousand colonies?—Ed.]

A GERMAN bee-journal, advising against too small entrances in winter, gives 1 centimeter high and 8 wide (scant $\frac{1}{2}$ inch high and $3\frac{1}{4}$ wide) as the right thing. How would that do in Medina? [I am inclined to think this is about right. For the last four or five years we have been testing entrances of various sizes—some $\frac{1}{2}$ deep by the width of the hive; some $\frac{3}{8}$ deep by 8 inches; some $\frac{3}{8}$ by 8; and still others $\frac{3}{8}$ by 6. Experience has shown—and that experience is confirmed by reports that have come in—that the two first mentioned sizes were altogether too much of a good thing. The colonies either died outright, or were so weak as to be practically good for nothing for the whole season. The colonies with entrance $\frac{3}{8}$ by 8 generally wintered well, while those with a little smaller entrance seemed to have a little bit the advantage. The smaller the entrance up to a certain point during very cold weather, the better for the outdoor bees, providing, however, the passageway is kept entirely free from dead bees. We occasionally get reports of how bees have wintered in a box hive with the bottom left open; but these are the exceptions that prove the rule. I am firmly convinced, from all reports and our own experience, that a very limited entrance, kept open by one or two cleanings during midwinter, is better than a wide one; but when it comes to indoor wintering, of course the larger the entrance the better. Some of our indoor colonies at one of the outyards had the usual narrow entrance. The dead bees were not cleaned out—result, all the bees in the hive dead and moldy.—Ed.]

BEEES BY THE POUND fell out of fashion in this country some years ago. Not so everywhere. In a single number of *Leipziger Bztg.* I counted 26 ad's of bees for sale by the pound. [Selling bees by the pound would be perfectly feasible in a country like Germany; but in a country like ours, 14 times as large as the German Empire, it is not feasible. We tried it once and had to give it up, because of the great

distances of travel. Bees in the form of nuclei can be sent almost anywhere in the United States with very little if any loss. If the combs are not loaded down with honey (and it has been our rule to select them just heavy enough with stores to carry them through, and no more) the express on the bees and the brood both (equivalent to a pound of bees), will not be much in excess. Our nuclei shipping boxes are made of $1\frac{3}{8}$ basswood, and are covered, top and bottom, with a very tough wire cloth, so that the weight is reduced to the lowest possible point. Then there is another thing. Taking a pound of bees out of a colony in the spring, and leaving its brood unprotected, takes the very life out of it; but if we take half a pound of bees out and a nice frame of brood, the bees that remain will easily take care of the brood that is left. The customer gets the equivalent of a pound of bees, and the shipper has a colony laying in much better shape. If we were to go back to the pound business, we certainly would have to charge more money. In our experience a large percentage of the pound packages had to be replaced by another shipment while the bees in the nucleus form would go through in good order, as a rule. —Ed.]



"You temperance folks want all the earth,"
Says little Tommy Toper;
"Not so," says Jim, his uncle trim,
"We simply want it sober."

C. K. Carter says in *Review*: "Take an old horse-blanket that has been used, and filled with sweat and odor, and put it on the hive, and the bees will not be so likely to sting a horse as they were before they had become acquainted with the odor."

Mr. Danzenbaker is here just now, and he says he objects to having his hive spoken of as the "Danz hive," as if that were his name. He wants the name in full, or a period of abbreviation after it. Still more opposed is he to such a word as "Danz" in place of his real name. His point of order is well taken.

Red raspberries, so writes A. W. Smith, of Parkville, N. Y., in *Review*, furnish a honey as light-colored as that from white clover, and he is surprised that Mr. Hutchinson should say it is not quite so white. Mr. E. A. Morgan, of Colbourn, Wis., also writes that the wild red raspberry blossoms in profusion for two months, frost or no frost. If killed once, twice, or thrice, it

will bud and blossom again. But whether the honey is dark or light in color, its flavor is equal to that of any other, and, to my taste, superior.

A prominent feature of the *American Bee-keeper* for a long time have been the articles of Deacon Hardscrabble. Although Uncle John frequently dipped his pen in sulphuric acid, and more frequently fired his gun toward those who might be considered his friends than toward his enemies, he scored a good many fine points. He has gone the way of all the earth, dying Jan. 27. A good photo of him appears in said journal for April.

In the *Review* for April is an article by that fine writer and skillful bee-keeper M. A. Gill, of Longmont, Col., on how he made 400 shook swarms. Here is a paragraph worth pasting, etc.:

Isn't it behind the spirit of the age for a full-grown man to stand around all day practicing the old mythical methods, and "wondering if the bees will swarm"? Why not open the hives and see if they are going to? why not swarm them? and if not, then go somewhere and hunt a job more pleasant and profitable. For my part, I like "intense" bee-keeping. This season it was necessary for us (my wife, one man, and myself) to go through two apiaries each day.

Again:

If I should use a little, hot, half-story hive to confine a large colony in for three or four days, until the bees are ready for a super, as friend Morrison advises, I should expect absconding. If I should fill a hive up with dummies (all except four or five frames), a *tu* Doolittle, I should expect absconding. But if we shake all the flying bees into a full sized eight-frame hive, with one or perhaps two frames of unsealed larvae and eggs, remove the super from the old hive, the super being filled with bees well at work on bait sections and full sheets of foundation, on to the new swarm, which is set upon the old stand, and given a well ventilated cover, the bees drenched with new honey, that will fly out in the shaking process, why should they abscond? And, furthermore, how could they, unless the queen should go on foot, as she is clipped?

In the same issue Mr. James A. Green gives us an article which I wonder has not been printed before. Much has been said about the advantages of producing either comb or extracted honey exclusively; but Mr. Green here shows good reasons for producing both conjointly. Mr. Green was formerly of Illinois; but, like Mr. Gill, he is trying his luck in Colorado.

The present may be called the "era of good feeling" among bee-journals. I find no personal differences being adjusted in them, and nothing in particular being debated. The right thing for the right place is now there, and bee culture may be considered as being conducted in a way from which there will be no radical departure for many years if ever. If any problem confronts bee-keepers it is the one that confronts all honest men—adulteration. I have just read a bitter complaint against it in a Swiss bee-journal. The writer says physicians are annoyed by it, not knowing what their patients get when a prescription is filled. One orders honey, for instance, for a sick man. The nurse goes to the grocery and gets what she supposes to be pure

honey, but "it consists of a mixture of cane sugar syrup and Chili honey, rendered agreeable to the nose by means of a lot of aromatic substances. These worthless and adulterated goods, not safe for the stomach of even a well man, are dangerous to the sick, and so adulteration finds a new victim. What avails medical skill with the best means at command when it has no guarantee that drugs and liquors are not adulterated? Even the infant in its cradle, as soon as it is weaned, is threatened with adulteration." However it may be with drugs, there certainly is no trouble in getting pure honey in this country. It is probable, however, that most groceries furnish a ready means for adulterators to unload their goods on the public.



HOW TO GET WORKER COMB BUILT.

"Are you very busy this afternoon, Mr. Doolittle?"

"Not extremely so, Mr. Baker. What can I do for you?"

"I wish to have my bees build their own combs this summer; and whenever I try to have them do this, they seem bent on building drone comb. How can I prevent this?"

"When any colony is so weak that it has no desire to swarm, during or preceding the swarming or honey-flow, such a colony will invariably build worker comb, so that worker brood may be reared till the colony comes into a prosperous condition, providing they do not have sufficient comb already built."

"Why can I not use some of the weak colonies I often have in the spring in that way?"

"You can. Taking advantage of this fact I use all colonies which are too weak to store honey to advantage, at the beginning of the honey-flow, or as many as I wish to use for this purpose, treating them thus: Their combs are generally all taken from them excepting two, one having a little brood and considerable honey in it, and the other one being as nearly full of honey as possible, giving all the other combs having brood in them to other colonies so that they will be still stronger for the honey harvest."

"Don't you leave any of the combs which they may have, having neither honey nor brood in them for their use?"

"No. If I did it would defeat my object, for the bees would clean up such combs, and the queen lay in them, instead of the bees building any comb at all."

"I see. But excuse my interrupting. Go on with what you do with the colony after you have taken all away but the two combs."

"I now put in one, two, and sometimes three frames having starters in them or frames which are partly filled with comb, just according to the size of the little colony after having taken their combs away."

"Excuse my breaking in again; but what do you mean by starters?"

"Take a strip of comb foundation one-half inch wide and as long as your frame is wide between the end-bars, and with melted wax stick this along the center of the under side of the top-bar of your frame, and you have a starter that will beat any other which I know of."

"And what did you mean by frames partly filled with comb? Where do you get these?"

"These are any combs which any colony of bees may have started at any time and not completely filled the frames with the same. Or they may be frames once filled with comb, a part of which may be drone comb, which I have cut out, or holes, which have come about by some accident to the combs, such as mice gnawing them, or the bees tearing them down to get out moldy pollen or something of that sort; or I may have allowed the bees to build comb when they were not in the condition to build worker comb exclusively."

"And will the bees patch up such combs as these, filling out with worker comb?"

"Most assuredly they will if the colony is in the right condition."

"Well, that will be lots of help to me, for I have many combs partly drone and partly worker that I did not know what to do with, and now I will make the bees patch them. But go on or I may not know how after all."

"In all this work I always see that each little colony has a frame well filled with honey; for, should storms or cloudy windy weather come on at this time, they would build no comb of any amount, and might starve; while with the frame of honey they will go right on converting that honey into comb, storm or no storm. If the right number of frames is given to suit the size of the little colony they will fill them quickly, especially when honey is coming in from the fields; and each comb will be filled with worker brood as fast as built."

"How long will they build worker comb?"

"If not too strong they will generally build comb of the worker size of cells till the brood begins to emerge from the eggs first laid in the newly built combs by the queen; but as soon as many bees emerge they are liable to change to the drone size of cells; or if the little colony is quite strong in bees they may change the size of cells sooner than this if honey is coming in very rapidly."

"What is to be done then?"

"As soon as the first frames I gave them are filled with comb I look to see about how many bees they have; and if they are still

well stocked with bees, or are in a shape where I may expect that they will change the size of cells before they reach the bottom of any frames they may have started with worker comb, I take out any full frames they may have already built, and thus put them in the same condition they were in when I started with that colony."

"Will they do as well in this way as they did at first?"

"They will not build combs quite as freely now as they did before, unless there can be some young bees emerging; so if I can, conveniently, I give them a comb containing mostly honey with some emerging brood (if they have such a comb it is left with them, which is more often the case than otherwise) from some other colony, when they are ready to work the same as before. If just the right amount of brood is left, or given them, so that they stay in about the same condition, they will build worker comb all summer by the apiarist supplying them with honey or feed when none is coming in from the fields. If not so strong but that I think they will build worker comb still longer, instead of taking the brood away, I spread apart the combs now built, and insert one or more frames with starters between, when these will generally be filled with worker comb before enough young bees emerge for them to change the size of cell."

"Suppose they do change the size of cell, what then?"

"One thing is always to be kept in mind whenever you find them building drone comb. The combs they then have, all except the one mostly filled with honey, are to be taken away so that they may feel their need of worker brood again, when they will build cells of the worker size once more."

"Have you used this plan much?"

"To the extent that I have had hundreds of frames built full of worker comb in this way, hundreds completed that the bees had built partly full the season previous, and hundreds if not thousands patched where I had cut out patches of drone comb which had gotten in in one way or another; or where I had cut out pieces of comb having little larvæ in that were to be used in queen-rearing. In this way the bees fix these holes in any comb in a very perfect manner; in fact, very much better than any man can do it by fitting in patches of worker comb as was the manner of fixing up combs having a little drone comb in them, during the past. Therefore I do not fear mutilated combs nearly as much as I formerly did."

"This has been an interesting and profitable talk with me, and I feel very grateful to you for telling me so freely. I will be going now. Good day."

"Good afternoon. If you see anyone of your bee-keeping friends who wishes a mutilated comb fixed so it will be a surprise to him, tell him to give it to a little colony fixed the way I have described to you, and let him see what nice work they can do at patching with all-worker comb."



THE bee-keepers of Pennsylvania effected a permanent organization at Williamsport, Pa., April 12. The following were chosen as officers: President, H. A. Surface, of Harrisburg; Vice-president, E. E. Pressler, of Williamsport; Secretary, Rev. L. D. Woods, of Muncy; Treasurer, E. L. Pratt, of Swarthmore; Executive Committee, R. D. Barclay, of State College; C. N. Green, of Troy; E. F. Phillips, Philadelphia; E. A. Dempwolf, of York; J. D. Costello, of Harrison Valley. Two additional vice-presidents were chosen — John Prothero, of DuBois, and Wm. A. Selser, of Philadelphia. Prof. Frank Benton, of Washington, delivered an address on bees, at the evening session. The next session will be in Harrisburg next December, of which due notice will be given.

SUCCESSFUL WINTERING OUTDOORS IN SINGLE-WALLED HIVES.

A SHORT time ago one of our friends and patrons, S. F. Miller, North Manchester, Ind., said he sent us an article that I ignored, something over a year before, that he said he considered to be one of the best on the subject of outdoor wintering that we had ever received; that he had aimed to give, briefly, to the bee-keeping public what had cost him something like \$600 in loss of bees. I immediately had a search made, and found that such article had been sent, but it came in June, when it was entirely out of season, and when, as a rule, communications on wintering are shoved aside, and the general subject of honey-production and summer work in general are of more vital interest. As our friend was an extensive bee-keeper it seemed proper to go over the article very carefully, and discover what it was that he considered of such vital interest to the bee-keepers at large. Well, here it is: It is wintering in single-walled hives having a Hill device put on top of the frame. A piece of old carpet is spread over the hive, large enough to hang down over the sides a half or two-thirds of the way all around. Another one is spread on in the same way. Over this is then set an empty super, squarely over the top. This is filled full of rags packed all round the edges. The oilcloth that covers the frames is then put over the whole, and, last of all, the regular hive cover. This, in the opinion of our correspondent, beats all cellar wintering he ever saw or heard tell of, better than a double-walled hive, and warmer. Chaff, he says, is too light.

During the past severe winter he transferred 380 colonies on empty frames in 27

different localities from 5 to 22 miles apart, and they all wintered well, notwithstanding that half the bees about him were dead from winter losses.

Perhaps the matter is a little out of season; but I am willing to place it before our readers; but I would suggest that they first test it in their own locality in a limited way. A plan or method that will answer for one bee-keeper or for one part of a State will often prove to be a failure in another.

WINTER AND SPRING LOSSES HEAVIEST FOR 20 YEARS.

THE reports are still coming in, and the situation is, if any thing, more serious than last reported. The losses are confined to localities around the lakes, mainly. As before, Michigan, New York, and Pennsylvania seem to be the chief sufferers. The backward spring has been a fearful setback to the bees. In York State the losses are so severe that not only the beginners but even the veterans, according to inspector Stewart, in many cases, have suffered heavily. Taking it all in all, I am rather of the opinion that the aggregate mortality for the lake regions will be the heaviest known for a period of over twenty years.

ANOTHER TALL SECTION USING SHIPPING CASES AND SUPERS.

ONE of our neighbors, Mr. J. B. Hains, of Bedford, O., well known to our older subscribers—in fact, he was the inventor of the Hains feeder—uses a section $5\frac{1}{2}$ in. high by $4\frac{1}{4}$ wide and $1\frac{1}{4}$ thick—that is, he divides up the length of a super, designed to hold $4\frac{1}{4}$ sections, into three equal spaces instead of four. For example, the section-holder is just 17 inches wide in the clear. If we divide up this 17 inches we get three spaces $5\frac{1}{2}$ inches each—instead of four. This makes it possible to use the section in an ordinary super, laying it on the side, of the dimensions above given. It also makes it possible to use the regular shipping-cases for $4\frac{1}{4}$ sections. Mr. Hains' argument in favor of this size is that it makes a thin comb of large surface, and it holds approximately a pound; that the bees will fill these thin combs quicker, and finish better, than they will thicker ones, and that such sections fit his regular supers and shipping-cases without any change whatever. The boxes certainly present a very pretty appearance when filled with honey. Of course, a section taller than broad, laid on its side, or, more correctly speaking, a good deal broader than tall, will have one long side not so well filled out as the other long side, while a tall section that stands up in the super will have one short side imperfectly filled out instead of the long one. Mr. Hains says these sections laid on their side are nicely built out by the bees, and that no one but an expert would notice which way they were laid on the hive.

Mr. R. C. Aikin, however, gave the rule that the bees would more readily build a

comb downward, making it long, than they will build a shallow comb much wider than deep. I suppose there is something in it. But Mr. Hains prizes very much the feature of being able to use the regular supers and shipping-cases.

SOME LESSONS GLEANED FROM INDOOR WINTERING; A POSSIBLE SOLUTION OF CONFLICTING OPINIONS.

DURING the past winter we have been conducting a series of experiments on the general subject of wintering, particularly respecting the indoor plan. Our readers will remember that I have advocated a large amount of ventilation for repositories, even going so far as to recommend the opening of doors at night, and closing them again in the morning in moderate weather. Experience with our bees under the machine shop has shown most conclusively that far better results have been secured by giving the bees frequent infusions of fresh air than by shutting them up and compelling them to breathe the same air over and over, day after day. But in this there were some prominent and skillful bee keepers who took issue, and it seemed difficult to harmonize their opinions with the other school to which I belonged who contended for ventilation.

We put 250 colonies last winter into a small compartment under the machine shop, with the rumble and roar of machinery above, with the occasional dropping of heavy castings, and the constant walking to and fro of the employees during working hours. How did they come out? There was a loss of only one colony, and that a nucleus, out of the entire number. There were very few dead bees on the floor, and what there were showed no signs of disease. They were simply superannuated fellows that had served out their usefulness. I called Mr. Vernon Burt and Mr. Francis Danzenbaker into the cellar the day before taking the bees out, and they both pronounced themselves as being highly pleased with the conditions as they found them. Said Mr. Burt, "Why don't you winter *all* your bees here—save your stores, and be prepared for any kind of winter?"

"I would, but I want to experiment for GLEANINGS," I said. "We will continue, however, to put in more and more bees until we finally have them all in."

Half of the 250 colonies were two and three frame nuclei, and they could not possibly have survived outdoors. All of these were in healthy condition; and when we put a part of them outdoors a few days ago there was no spotting of the hives.

But I wish I could show as good results in indoor wintering in the two out-yard cellars, each of which contained from 50 to 60 colonies. The one at the north yard was damp, although it was built on the cistern plan with a large ventilator, as recommended by Mr. T. F. Bingham. From 10 to 15 per cent of the bees are dead, hives badly soiled, and there are many dead bees in

the bottom of the cellar. At the south yard the conditions are about the same, but not quite so bad. Why, then, if we can winter so perfectly under the machine-shop, with all the rumble of the machinery, can we not do as well at the two outyard cellars where it is perfectly quiet? The conditions are largely the same, *except* in the matter of temperature, which went down close to the freezing-point for long periods of time in both the outyard cellars. Right here was the cause of the dysentery and the losses—at least I do not look for it anywhere else. The dampness may have something to do with the matter, but I think not much. If the temperature could have been controlled by means of a stove when it went below 40, we should have seen far better results.

How, then, do I harmonize the opinions of those who differ in the matter of ventilation? Simply this: A cellar that has a large ventilator is liable to have the temperature go considerably below 40; and it is better to have little or no ventilation than to have such a drop in the mercury; but far better still is it to have plenty of ventilation and a uniform temperature. Mr. Doolittle, in his sidehill cellar, can control, if I am correct, the temperature providing he does not have open-air ventilators by which the cold from the outside, or the warmth either, can be conveyed into the repository. In our machine-shop cellar we control the temperature within a range of 10 degrees, and at the same time give the bees fresh air—large quantities of it—whenever it warms up outside sufficiently to raise the temperature inside. When I took Mr. Danzenbaker and Mr. Burt into the cellar the mercury showed 60 degrees—rather higher than usual; and they both will testify that the bees were very quiet, and the atmosphere clean and sweet. There were but few dead bees on the cellar bottom, and the conditions were almost perfect.

Perhaps this discussion is a little out of season; but when we have just come out of our cellar wintering we can best compare notes, and be prepared to act accordingly for the next season. The result of our observations thus far shows that, for successful indoor wintering, a *uniform* temperature centering around 45° F. is the first and most essential requisite; second, fresh air whenever the temperature goes above 55; third, dryness; fourth, good food. Now, then, I am prepared to indorse what Doolittle says, up to a certain extent. If a beecellar is in an outyard where artificial heat can not be supplied when the temperature goes low, there should be little or no ventilation; but when the temperature can be controlled—and here is where I disagree with my friend, whose opinions I always value much—then give plenty of fresh air.

I should like to have the whole bee-keeping fraternity see the splendid results of ventilation, and control of temperature in our machine-shop cellar; and perhaps another winter I will arrange for a delega-

tion of bee-keepers to come and see for themselves the "proof of the pudding."

Our shop cellar, with conditions as they are, is a great boon to us, because in the queen-rearing business we have a large number of nuclei, and I think we can winter these about as well as we can winter strong colonies; and, what is of vastly more importance, we save anywhere from 5 to 10 lbs. per colony in the smaller consumption of stores. But this is not all. The light eaters will be more vigorous, and in better shape the coming spring. Show me a man who is a heavy eater and I will show you one with a red nose, and who probably will not live out his allotted days. He will complain of feeling old, sick, "grippy," and drowsy after meals. If the bees have to eat heavily to keep up animal heat they are drawing on their vitality, and will in consequence overcharge their intestines, resulting in dysentery.

How about our outdoor bees? Our loss was about ten per cent. When they went into winter quarters they were all strong and in prime condition. The survivors are now little better than three-frame nuclei. But the outdoor bees fared about as well as those indoors where the temperature went down too low.

DEATH OF GEN. D. L. ADAIR.

THE following has just come to hand on a postal card:

General D. L. Adair, Mexican-war veteran, and inventor of the Adair hive, expired suddenly at his residence near Havesville, Hancock Co., Ky., yesterday morning from heart failure. He was above 80 years old.

Adair, Kentucky, April 20.

J. C. LEWIS.

I shall have to explain to our younger readers that General Adair was at one time, some thirty years ago or more, one of the brightest and most valued writers for the *American Bee Journal*. It was he who gave us the Adair frame; and Adair and Gallup together gave us what was called the "Long-idea hive." If I am correct, it was Mr. Adair himself who first suggested that, instead of making the hive two or three stories high, we simply lengthen it out like a watering-trough, adding surplus combs to the back end opposite the entrance as fast as they were needed, according to the growth of the colony and the amount of honey coming in. Just now I recall only one apiary that is managed in this way. Our friend O. O. Poppleton, of Stuart, Fla., still uses this arrangement very successfully. He claims he gets just as much or more honey, and he also obviates the necessity of lifting off an upper story, which his strength will not permit him to do. General Adair was a vigorous writer, and I believe he was a successful bee-keeper. About the time GLEANINGS started (1873) he somehow or other dropped out of sight—probably becoming engaged in other business; and I have several times thought it rather unfortunate that he should have so suddenly ceased writing for any of the bee-periodicals.

It would seem from the above notice that, even though General Adair did die of heart failure, he lived to a good old age. During the time he was actively engaged in apiculture, and writing for the journals, he did much to stir up an interest in apiculture, and to turn deep thinkers and experimenters into channels that might not otherwise have been explored. It was his (or his ancestors') name, if I am not mistaken, that gave the town of Adair, where the above postal card was written, its name.

About the time GLEANINGS was started, I had a chromo made of a hexagonal apiary, each hive being shaded by a grapevine. At that time I planned a standard extractor, a standard hive, and a standard frame. My standard frame at that date was the Adair, $11\frac{1}{4} \times 13\frac{3}{8}$; and the standard hive was made long enough to hold 20 frames, one story high, the entrance being at one end. At that time I endeavored to get the bee-keepers of the world united on a standard frame, and suggested the above dimensions. Very soon I found out, however, I had made a mistake. There were not only more frames of the Langstroth dimensions in common use than any other, but the majority of the bee-keepers preferred the Langstroth size to any other; and, if I am not mistaken, the same has held good during all the thirty or more years since then.

Another of the veteran bee-keepers and writers has been called to his long home—another reminder to those of us who are getting well along in years that our stay in this world is coming to a close. Peace to the ashes of Bro. Adair.—A. I. R.

THE GROWING POPULARITY OF THE FENCE SYSTEM.

VERY recently I had occasion to go over some of our back volumes, and also some other periodicals devoted to bee-keeping. Some things interested me, especially in the light of the present. When I first introduced* the fence and plain-separator system I was enthusiastic in its praise. But very soon there began to be doubting Thomases. The new thing was declared to be a doubtful innovation, a silly fad, notwithstanding it had up to that time been used by various persons for eight or ten years with a good deal of success. It is somewhat interesting *now* to read over the prophecies of failure that were made *then*. It was declared that the plain sections would not crate, and that the whole system was a fraud on the public. The condemnation that was heaped on it reached the point of personal abuse. Now what are the results? In spite of this opposition it has steadily worked itself into favor among bee-keepers, until the fences are now made in one factory alone at the rate of half a million a year—enough to super two million plain sections at a time. Honey in plain

sections has come to be very common on the market; and the idea that it won't crate is exploded long ago.

There is no feeling of pride on my part because that system as a whole has been vindicated away beyond my expectations, nor, on the other hand, any feeling of resentment. When a new thing is introduced, especially if it has any merit, there is always bound to be, if the past is any criterion, more or less opposition, even from good men. This is but natural, for it is a fact that many things are foisted on the public before they have been carefully tried. Very often the public and not the manufacturer is the sufferer.

The following is a sample of the letters that now come in. Contrast this with the utterances of a few years ago.

NO BRACE-COMBS WITH FENCE SEPARATORS.

Mr. Dibbern says he has had trouble with brace-combs where fence separators are used. I use the ten-frame Langstroth hive and Danzenbaker super, and have had no trouble with brace-combs. I have used solid board separators, but I have had more trouble with brace-combs than with the plain tall section and fence separators; in fact, I do not remember having brace-combs attached to slat separators.

Almost all of my comb honey this year was in tall plain sections, and you would think that it had been made by machinery. I sent some to a retired comb-honey producer, and he pronounced it the finest comb honey he had ever seen.

I use full sheets of foundation in sections, and would not think of using starters, as I get, I think, a fourth more honey or more by using full sheets.

I consider the fence separators and tall plain sections the greatest boon to comb-honey producers ever introduced.

WALTER M. PARRISA.

Lawrence, Kan.

MICHIGAN'S LAST PINES; THEIR AWFUL SLAUGHTER; IS THERE A SUBSTITUTE FOR WHITE PINE FOR HIVES?

THERE is something grand and majestic in the half tone of those pines shown elsewhere, and at the same time something awful and melancholy too—grand and majestic because of their stately dignity and the utter stillness that breathes through their very atmosphere; a awful and melancholy because of the ax and the forest-fires of man.

When I last went through Michigan, spinning by vast areas of devastated country blackened by fires showing only here and there black shafts of the once noble pine in all its primeval glory, there was a feeling of sadness that came over me. The land was unproductive for agricultural purposes, and, contrary to what we might naturally suppose, instead of new pines springing up to replace those cut away, worthless scraggly scrub oaks dotted the ground here and there, with here and there a hovel where dwelt some man and his family too poor to move to better soil. When I made the inquiry whether the pine could not be made to grow on land where they once grew, I received doubtful responses. Pines, it was said, would not spring up spontaneously like other forest-trees; and even if they did, the hunters with their campfires would soon make short work of them. Have there been no attempts made on the part of the State to reseed or replant

* By this I do not mean "invent" or "originate," for I did neither. I simply brought before the public an old thing which I thought had great merit.



MICHIGAN'S LAST PINES.—PHOTOGRAPHED BY W. Z. HUTCHINSON.

This shows the virgin forest white-pine trees of which hives are made—the only really good timber in the world for the purpose. The section shows a part of a small tract of white pines in Otsego Co., Mich.—the last tract of its kind in the State, and one of the last in the whole country. This particular lot is now being rapidly cut out with a mammoth sawmill equipment at the enormous (shall I say awful?) rate of 200,000 feet every 24 hours, the year round. At this rate these grand old monarchs that, in days gone by, have made Michigan great, will soon be gone, never to be replaced. See opposite page.

with new pines? Yes, but they were abortive, and the experiment was a failure. Thousands and thousands of acres of land that once sold at big prices, because of these very pines now all gone, are begging an owner who will even pay taxes on them. The land is just as good as it ever was for growing pines; but the conditions brought about by civilization have made the starting of new trees impossible. Laws have been passed, restricting hunters; but the Indian, who is amenable to no law, will build his fire when and where he pleases.

I had supposed that all the Michigan white pine had been cut out of the State; but it seems my brother-editor, Mr. W. Z. Hutchinson, editor of the *Bee-keepers' Review*, has found one small tract—not so very very small, either, in a way, but small in comparison with what these tracts once were before so-called civilization had pushed itself among them. From a photographic point of view the original of this picture is a work of art.* The illumination, the high lights and shadows, the penetration, definition, and atmosphere, are all ideal. W. Z. H. has a true sense of the poetic and artistic; and when he walked some five miles over the ties, carrying a big camera (for the lumber company would not let him ride on a log-train without a permit), and when he bunked with the lumber men in camp, and partook of their rations, and when he spent hours and hours of time hunting for the right spot, and waiting for the light to get just right, he showed the instincts of a true amateur—a type of a limited class of artists who are more expert than the average professional.

I have tried my hand at taking pictures; but I always feel like taking off my hat to my brother editor, who excels me every time; and I do not feel so very bad about it either; for there are very few amateurs in the country who can equal him, and fewer still who can surpass him.

But let us go back to the subject of our picture.

Is there any timber in all the world that meets all the conditions required in a hive so well as white pine? The echoing responses from thousands of bee-keepers answer back, "No, no."

There are other timbers that will stand the weather, but they are so tough as to be hard to work. There are other timbers that are workable, but they will not endure the sun and the rain. Go over this world where you will, there is no other wood that is so suitable for general purposes as the genuine white pine. There is a so-called white pine in Oregon; but it is tough, brittle, and lacks many of the essential qualities that have made the white pine of Michigan so famous. There is the redwood of California, perhaps the very best substitute for white pine in hives; but it has the disagreeable fashion of shrinking endwise, being brittle, and unsuitable for brood-

frames. It stands a dry climate perhaps better than white pine; but in other respects it is not the equal of it. The sugar pine of Central California is another excellent timber; but it, too, tough and brittle, falls far short of the ideal conditions. The yellow pines of the South (and we may have to use them some day) are too pitchy, and the timber too heavy, to be really suitable. The whitewood of Kentucky does very well, but it will not stand the weather, and has to be constantly covered with paint or it will soon deteriorate. Basswood will not weather either, and, besides, it is becoming nearly as scarce as white pine. The inevitable conclusion is, that the best timber in all the world for hives is becoming scarcer and scarcer; else why should bee-keepers east, west, south, and north pay bigger prices for hives made of it?

The most of our white pine comes from Canada, with the duty added. How long this supply of our northern borders will last is hard to say; but the same machinery that cleaned out our own timber has been imported across the line, over into Oregon, and throughout the South. No effort is being made to replace our valuable timbers; and the coming generation may be compelled to use brick, stone, and iron, and perhaps strawboard and other material made from scrub timbers ground up and worked over into a pulp. The sad thing about it is, one generation does not have very much regard for the generation that is to come. We look out too much for our present needs, without a thought of what posterity will require. If we could grow pine and basswood as we grow hay and straw, enough to take care of a season's supply, then the problem would be simple.

BEES AS A NUISANCE(?).

It would seem almost out of place to discuss this question in a work intended for perusal and study of those who believe, and rightly, too, that bees are not a nuisance; but, as I shall show, there are reasons why we should calmly discuss this question in order that we may avoid trouble that may arise in the future. Certain difficulties have arisen between the keepers of bees and their neighbors. Perhaps the bees, after a long winter confinement, have taken a flight and soiled the washing hung on the line in a neighbor's yard; perhaps some of his children have been stung; perhaps there have been times when he has been annoyed while in the peaceable possession of his own property by bees coming on to his own premises, and smelling around, as they will sometimes do during the canning season when fruit is put up, when the aroma of sugar and of the juicy fruits is flowing out through the doors and windows of the kitchen. Perhaps the offended neighbor keeps chickens, and members of his feathered tribe have trespassed on the grounds of the bee-keeper. The result of all this is that a bad feeling arises. Complaint is

*I wish our reproduction of it could be as good.

made to the village fathers; an ordinance is passed declaring bees within the limits of the corporation to be a nuisance, and requiring the keepers of them to remove them at once or suffer the penalty of fine or imprisonment, or both.

In some instances, live stock has been stung; a cow or a calf or a horse may get near the entrances of the hives, which, we will say, are within a foot of a dividing line between the two adjoining properties. Perhaps the stock is stung nearly to death. Damage is claimed, a lawsuit follows, with the result that a feeling of resentment is stirred up against the bee-keeper. But this is not all. Possibly the bee-keeper has an apiary in his front yard, bordering on the general highway. A nucleus may be robbed out, with the result that the bees are on the war-path, and begin to sting passersby. Perhaps a span of horses is attacked; a runaway follows; damages are claimed, and another lawsuit is begun.

In the foregoing I have supposed *possible* instances. It is proper to state that they are only types of what has occurred and may occur again, and it behooves bee-keepers to be careful.

In the case first mentioned (the washing of the aggrieved neighbor soiled by the stains from bees affected with dysentery), it is well for the bee-keeper to send over several nice sections of honey, or offer to pay for the damage done to the washing. Nothing makes a woman madder than to have her nice clean white linen, after she has scrubbed, rinsed, and hung it out to dry, daubed with nasty, ill-smelling brown stains. But if our bee-keeping friend will take pains to offer an apology *before* the woman makes complaint, and show a disposition to make the matter good, trouble may be averted. And right here let me say, if the bees are in the cellar do not set them out on wash-days; or if they are outdoors, and the sun comes out bright, and they begin to fly strongly from the hives, send word to your neighbors and ask them not to put their washing out, if it is wash-day, for a few hours. Send along a few boxes of honey, and keep the folks across the way "sweetened up." Ninety-nine neighbors out of a hundred will put up with a great deal of inconvenience, and say, "Oh! that is all right. It won't take long to rinse out the clothes again."

Take, for example, the more serious cases where horses or cattle have been stung. If you have been foolish enough to place your hives near the highway or your neighbor's line fence where he has loose stock, you may have to pay pretty dearly for it before you get through. The remedy is prevention. Always put the bees in a back yard, and not too close to your neighbor's line fence. Be careful, also, to prevent robbing. See that there are no weak nuclei with entrances too large. As soon as the honey-flow stops, contract the entrances of all the weaker colonies. If extracting is done after the honey-flow, great caution needs to be

exercised. The extracting-room should be screened off, and bee-escapes should be provided. Wherever possible, take off all surplus by the use of bee-escapes rather than by shaking.

But we will suppose you *do* get into trouble. What are you going to do about it? We will assume that a city or village ordinance has been passed, and that your bees have been declared a nuisance. Do not move the bees if you have used reasonable precaution, but write at once to the Manager of the National Bee keepers' Association, whose address will be found in the back part of this book. If you are a member of the Association you will be entitled to protection, and possibly all or a part of the court expenses will be paid by the organization. But the Association does not undertake to defend its members against criminal carelessness of such a kind as I have already described; but when the bee-keeper has exercised every precaution, then it endeavors to protect his rights. This means, then, that you should become a member *before* you get into trouble. The annual fee for membership and protection is \$1.00.

Well, we will say the attorneys have been retained, and the Association is back of you. Any number of decisions have been handed down to prove that bees are not a nuisance *per se*; that, when they are properly kept, and due precautions are used, they can not be driven out of the corporation. There are several precedents from various courts, even from the Supreme Court of Arkansas, to show that bees have a right to be kept within a corporation like any other live stock, so that any ordinance not in conformity with these decisions can be declared unconstitutional. Several ordinances declaring bees to be a nuisance have been repealed. —*From new edition of the A B C of Bee Culture, now in press.*

CUTTING CANDIED HONEY WITH A WIRE, OLD.

REFERRING to the matter of cutting candied honey with a wire, one of our correspondents, Mr. William Russell, of Minneapolis, Minn., writes us that he has been using it for over ten years, and he supposed it was so old that every one knew about it, and he adds that the use of a taut wire to cut cheese, butter, and other like substances, has been in vogue across the water for thirty years. I have known that such use had been made, but did not know of its employment for cutting candied honey. This scheme of cutting honey has now been before the bee-keeping public for two months, and *only one* correspondent, since then, Mr. Russell, speaks of using it before. It would appear from this that it could not have been in very general use by bee-men or we should have heard from it more promptly.

From his ten years' use of the plan perhaps our correspondent can give us some new facts of interest, whether such honey continues to sell, whether it softens in summer, how to cut, etc.

RELATIVE VARIATION OF DRONES AND WORKERS.

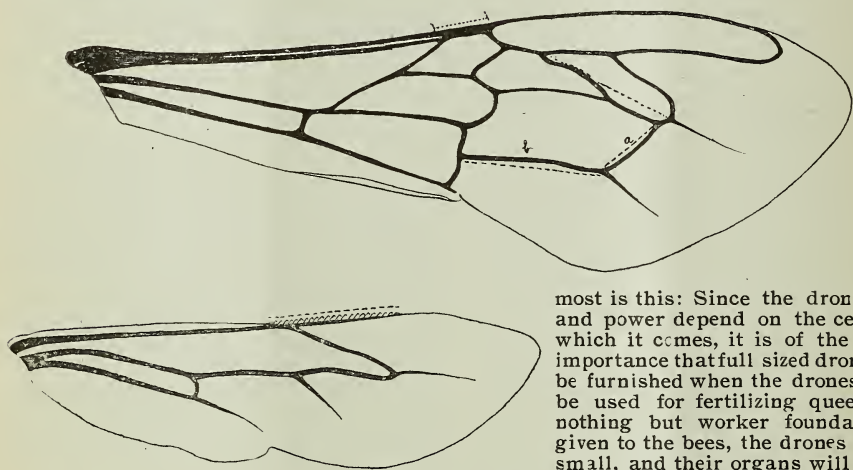
The Importance of Large Drones.

BY E. F. PHILLIPS.

It is, no doubt, well known to most of the readers of GLEANINGS that the drones in a hive vary in color more than do the workers from the same queen. Another fact still more easily seen is that there is a great difference in the shape of the body in drones which hatch from worker-cells and those which hatch from the regular drone-cells. From these two facts the inquiry arose as to whether the drones or the workers showed the greater amount of variation in other parts of their bodies; and to test this the writer, together with Dr. D. B. Casteel, of the University of Pennsylvania, made a series of measurements of 500 drones and 500

we divided the length of the vein marked *a* by the length of the vein marked *b*, and got a fraction which represented their relative lengths. After this measurement was all done (and it took considerable time) we arranged our results in the form of tables. Since these tables were made out to prove a point which has no bearing on apiculture I will not give them here; but they will be published elsewhere, since they are, perhaps, of interest from the standpoint of zoology. The facts brought out were that *the drones vary more than the workers*, and that *the variation depends on the cell from which the bee hatches*. For example, a drone from a worker-cell is long and narrow, with long narrow wings, while a drone from a full-sized drone-cell is fat, and has wide strong wings.

Now, the point which interests apiculture



most is this: Since the drone's size and power depend on the cell from which it comes, it is of the utmost importance that full sized dronecomb be furnished when the drones are to be used for fertilizing queens. If nothing but worker foundation is given to the bees, the drones will be small, and their organs will not get a chance to develop as they should, and their wings are not strong enough to support them when they take the marriage-flight with the queen. Small drones are perfectly capable of fertilizing a queen, as all bee-keepers know; but in the race for the queen it is the largest drone that is successful; and, in case a small drone does catch the queen, he will not be able to give enough spermatoc fluid to last her through life, and she will soon dwindle.

There is one fact that some queen-breeders overlook, and it seems very desirable to point it out as plainly as possible. The male has just as much influence on the offspring as has the female, and just as much care should be exercised in the choice of the drones in a yard as is used in choosing the breeding queen. If a man pays \$10 for a breeder, and then lets all kinds and sizes of drones fly in his yard, he generally gets what he deserves; and that is, a poor lot of queens. It is the customer who suffers, since a queen may leave the apiary tested, and in capital condition, and the results of incomplete fertilization not show for some time. Of course it may happen that the breeder gets fairly good results; but he

workers. In this work the wings were chosen, since they were the most satisfactory organs that we could find, as they do not shrink in alcohol.

Before going into details a few words along another line may be allowed. As is well known, the drones come from parthenogenetic eggs, and the workers from fertilized eggs. On general principles it might be supposed that, since the workers have two parents, they would naturally vary all the way between these two parents in their characters, while the drones, with one parent only, would tend to be like that one parent. If we did nothing but sit down and reason the thing out we should come to the conclusion that the workers would vary more than the drones; but while reasoning is all right in its place, it must be preceded by observation, and we shall see in what follows how well our reasoning serves us.

The illustrations which accompany this article show the veins on the wings of the bee. Five measurements were taken for each bee measured, and the points marked in dotted lines show what these measurements were. Besides this, for each wing

must not take any credit to himself for it. All drones from poor queens should be trapped, and all good queens should be provided with drone comb—on drone foundation—to make sure that their drones will be large; and it is just as necessary to do one of these things as the other. The reason that drone foundation is recommended is that the transition cells between drone and worker sizes produce irregular drones, and the use of foundation overcomes this.

If any of the readers of GLEANINGS have any facts which prove or disprove the results of our measurements it would be considered a favor if they would write me a letter stating these facts. Dr. Casteel and myself do not care to ask for theories, since we can make those up to suit ourselves; but any reliable information might be of considerable help, and offer suggestions for more of this work, which will be done in the future by one or both of us. In case any one has any suggestion to offer, the letter may be addressed to Biological Hall, University of Pennsylvania, Philadelphia. and will be appreciated.

Philadelphia, Pa.

PACK MULES FOR CARRYING BEE-SUPPLIES.

Making Use of Them for a Yard up in the Mountains.

BY HENRY E. WOEST.

I have an apiary located eight miles from a wagon-road, with only a pack trail to it. There are now 130 colonies of bees in it.

The honey-cans were packed on the donkey and horses. Bee-hives, tank, extractor, etc., were packed on the three animals in the three former years. In the photo the donkey has on 22 five-gallon honey-cans. I have packed lumber from one to twelve feet long on those three animals. A load would be from 60 to 120 feet of lumber, depending on weight. During the year 1903 I packed on those animals 350 empty five-gallon honey-cans, 6 tons extracted honey, and 3500 feet of lumber with which to build a house.

Newhall, Cal., April 12.

A WISCONSIN APIARY THAT PRODUCED 15,000 LBS. OF HONEY LAST SEASON.

A Galvanized Hive-cover.

BY LOUIS C. KOEHLER.

I mail you two photos. One shows a part of our apiary of 252 colonies. From this apiary we received, during the past season, 15,000 lbs. of extracted honey. We do not raise comb honey for sale. The little that we do raise we give away. We have a retail market in the neighboring towns where we dispose of all our honey. Some of our customers consume as much as 150 lbs.

The other photo shows the front room of our extracting-house. This house, which is 16×28 ft., is used only for apparatus belonging to the bee business. The back room is our storage-room for honey, and the upper story is used for storing empty boxes, supers, supplies, etc.



A HORSELESS WAGON FOR CARRYING BEE-SUPPLIES UP INTO THE MOUNTAINS.

You will notice that I use a false or weather cover over the regular cover. At first I used half-inch boards for this cover, mostly basswood; but I found that, in spite of paint, the cover would not last long, and clear lumber became quite an expensive thing, besides the trouble of renewing the cover every few years. Then I tried roofing tin for covers, without any boards on top, but I did not find that very satisfactory. The tin would rust through in a few years, quickest where it was nailed. Besides, the covers were too light to stay on in any wind; they would also bend up so that they became very bad-looking at best. I next tried galvanized iron, but found that it would also rust where a nail was driven, and found the same trouble with the wind.

The cover I use at present, the kind you see on most of the hives in the photos, I find perfectly satisfactory. It consists of a rim and a rounding top covered with galvanized iron crimped over the projecting edges of the top. This does away with the nailing, as the galvanized iron is held on by means of the crimping of the edges. The cover is also heavier, and is more firm. The boards under the galvanized iron may be of any grade, as they are not exposed to the weather. The only thing that I see against the covers is the first expense; but I believe

that, in the long run, they are the cheapest.

Tisch Mills, Wis., Jan. 13.

[Your interior view suggests several interrogation-marks. What about that Given foundation-press that shows over to the right of the picture? Is it in service yet? and if so what about the foundation? Then we notice that one of your extractors is high-g geared, and the other low-g geared. Why this? Can you not give us a little more light? Your picture suggests that you are a practical bee-keeper.—Ed.]

LABOR-SAVING IN SNOWY WINTERS.

The Experience of a Veteran.

BY T. F. BINGHAM.

The uncertainty of winter, and the fuss of putting bees in a cellar, have left the winter problem a debatable one in the middle and northern portion of the United States. Continuous uniform cold has not, within the past twelve years, pervaded so wide a region as has the winter just past. From Nov. 1 to March 14 not a single day has favored or permitted the flight of bees, even in protected places, in this vicinity;



KOEHLER'S APIARY WITH GALVANIZED COVERS.

and while the extreme cold has not been any greater than usual the warm or mild sunny days have gone far below the average. The warming-up of thin frosty hives, so frequently observed in the journals, has been practically eliminated.

Of course, it is too early to obtain any definite data regarding the outcome. All we can know at present is that it has been a source of great satisfaction to feel that bees were at least no worse situated in a good or even poor depository than if out in the snowdrifts for so long a period. It is true we have not had to shovel out the hives in order to allow the bees to have a cleansing flight, as would have been a necessity had an occasional warm day occurred. Those further south than Michigan, no doubt, have had sufficiently unsettled weather to enable their bees to fly; but, so far as I can learn, this State, while in latitude differing widely, has not materially differed in cold. In fact, our extreme cold here has been less than elsewhere in the State. We have no signal office here, but we have in many private yards thermometers, none of which have registered more than 20° below at any time, and only once at that, which was in December; since that, two or three mornings 15° to 17° below. Now, in my yard where the bees usually are in summer the snow is a smooth cm-

pact drift two feet deep (March 12); I need not write how much trouble my air-tight multi-ventilated water-lime cellar has saved me this winter; and now, while the March winds are blowing, the bees are as contented as they were a month ago. They can be kept another month with the facilities of ventilation possessed with little inconvenience. Then comes the one thing not enjoyed by bee-keepers; viz., getting them out on their summer stands. It is not certain how they will come up out of the cellar. Last fall an elevator was provided to lower them into the cellar, and the machine was a great success; but the bees then were in no haste to fly out. A month hence it will be different, and perhaps they will be carried upstairs with less trouble some other way.

Farwell, Mich.

A FEW POINTS ON SHAKEN SWARMS.

A Method of Management for Comb Honey whereby one Can be Away from his Bees all Day without Danger of Swarms Leaving.

BY GEORGE SHIBER.

One of your correspondents, p. 289, asks for a plan of management of bees during swarming, saying that he had tried shaking them, but they all swarmed out, and



THE INTERIOR OF KOEHLER'S EXTRACTING ROOM.

that he had to leave his bees from 7 A. M. until 6 P. M. each day.

Years ago this swarming business was a more serious problem than now. If my friend Sturm's bees all absconded after shaking there must be faulty management somewhere. He says he "shook three," and three absconded.

For his benefit and that of any one else who is bothered in this way, let me tell how I manage forty colonies, and was obliged to be away from home the season through from 7 A. M. Monday until 6 P. M. Friday.

Every Saturday I went through the hives that were likely to swarm. Those that had queen-cells with hatched larvæ or sealed cells were treated as follows: An empty hive was prepared with six or seven Hoffman frames with half-inch starters and one comb of hatching larvæ. This new hive was placed upon the stand of the one to be operated upon. Previously the old colony was thoroughly smoked to cause them to fill their honey-sacs.

An empty body was placed on the new hive (no cover on the new hive); the old hive with bees and combs on this empty body; over the top, place one of Dr. Miller's robber cloths; smoke under the cloth, flopping it as you smoke; then quickly pick out each frame and shake into an empty body below; place combs of brood, now free of bees, in another body, and place it over a weak colony. Now go back to swarm; sweep the bees down into their new hive from the sides of the empty body on to the six frames of starters and the one comb of brood. This comb of brood can be taken from the shaken hive, but see that there are no queen-cells on it. Now put the supers on from the old hive. Perhaps there was one super on the old hive, partly filled. If so, put another one empty underneath. Cover them up, and, if clover is in bloom, they will do you some good. I shook perhaps 25 or 30 last year, and never had a failure. Some years they have swarmed out, but not many. The ones most likely to swarm out are the ones with a sealed queen-cell. I have figured that they have planned to swarm, and they seem to think it natural to do so, whether they were shaken the day before or not. Not all will do this; but these are the ones that do, if any. Place a shade-board over the shaken swarm, and give them a good deep entrance.

The old combs of brood placed over a weak colony can be used for extracted honey, for in a week or so they will be quite strong; and if the season is prolonged they will gather quite an amount of extracted honey.

One thing more—I have concluded that combs are better to shake bees on than starters, if I have them; and I get more honey from such. I usually use about six combs. Bees will at first fill these combs with honey; but in a few days the queen will need all the room in six combs to lay in, and the honey finds its way upstairs. Starters are more profitable to use than

foundation, for full sheets to fill six frames will cost about 35 cts., and I don't think you make any more by the use of it over starters.

The queen will lay more readily in old black combs than in new ones, so the new comb from foundation the bees fill with honey before the queen uses it, and then seem loath to carry it upstairs; but with the black comb, instinct seems to teach them that that is the place to rear brood. The plan of forced swarming is certainly a long step in advance.

Last year I managed forty colonies on the above plan, secured a good crop of honey, and devoted only one day in the week to them; all this takes practice and time to learn and become familiar with. I have been twenty years learning how, and want to learn more.

Randolph, N. Y., March 28.

A HOME-MADE UNCAPPING-DEVICE.

Some Good Ideas.

BY C. J. GREENE.

As there may be others who, like myself, do not feel that they can afford to buy one of the expensive uncapping-cans as shown in the catalogs, and also want one that will hold several frames after they have been uncapped, I submit the following description of an inexpensive uncapping-tank.

The tank is made of one piece of galvanized iron 28 inches wide and 40 long, cut at the corners and turned up to form a pan $18\frac{1}{4} \times 30$ outside measure, and has a honey-gate soldered to one end at the lower corner so as to drain the pan. This tank is placed in a box made of half inch lumber, which is $18\frac{1}{4} \times 30$ inside measure, and $5\frac{1}{2}$ inches deep, with legs at the corners which extend below the box about 11 inches, the front legs being made an inch shorter than the back legs, to allow the honey to run toward the gate. In making the box, first nail the sides to the inside of the legs, even with the outside edge of the legs; then let the ends extend to the outside of the legs. This leaves the box with square corners inside. The front end is notched over the gate, and held in place by four screws. By removing this piece the tank can be lifted out and used on the kitchen-range for bottling honey, etc. This is one of its useful points. Over this tank is placed a frame made of 1×1 -inch strips having the same inside measure as the box, and covered with wire cloth, the same as is used in extractors, and supported by 3 cross-strips which may be V shaped, with the sharp edge next to the screen—see B B. The screen is held in place by four small brads which are outside the box next to the legs. Above the screen is a box made in the same way as the lower one, but without bottom, and twelve or more inches deep. On top of this is fitted a sliding frame, see D. This frame is made of two pieces of 1×1 inch,

two inches longer than the width of the tank, and three cross sticks, 6 inches long. At the ends on the under side are nailed $\frac{1}{2}$ -

may be made at home, from lumber of packing boxes, or such cheap material, so you see it is a very cheap arrangement for so useful a one.

The legs and corners are made of 1x2 in. strips. The object in having legs on it, rather than a solid box, is to allow you to stand closer to it in working.

Owens Mills, N. Y., Feb. 25.

[Your ideas are most excellent, and come at a time when the bee-keeper may make a machine and have it ready for use this season. The only suggestion or improvement that I would make would be to make frame D narrower, and mount in the middle of it a nail-point projecting upward, on which the end-bar of the frame to be uncapped can be pivoted.

But, say — when the wire cloth has been heaped up with cappings is there not danger that the honey drippings would run over the sides? To prevent this I would suggest again that the tray have a raised rim of two or three inches. Our

artist failed to show the bottom tray notched out to receive the honey-gate for removal of the pan.—ED.]

SECTIONAL BROOD-CHAMBERS.

Some of their Principal Advantages, and an Important and Valuable Suggestion on how to Make Forced Swarms Stay "Shook."

BY M. R. KUEHNE.

As you invite correspondence from bee-keepers who have used the sectional brood-chambers, i. e., two or more Ideal supers with shallow frames for a brood-nest, p. 23, I wish to give my experience with them, and also some other things.

I am well aware that perhaps locality as well as circumstances and the different management has much to do with one's like or dislike of using these shallow frames, which, of course, have their advantage as well as disadvantage; but I must say that, after using them side by side with the deep frames for quite a number of years, I have finally come to the conclusion not to invest in any more deep frames.

As to disadvantage, I could mention a very serious one, especially where one practices migratory bee keeping — that is, to fasten two or more supers so they will stay fastened in moving over rough roads of different descriptions, especially in mountainous countries like California. But there is surely one great advantage in using a shallow frame where one has out-

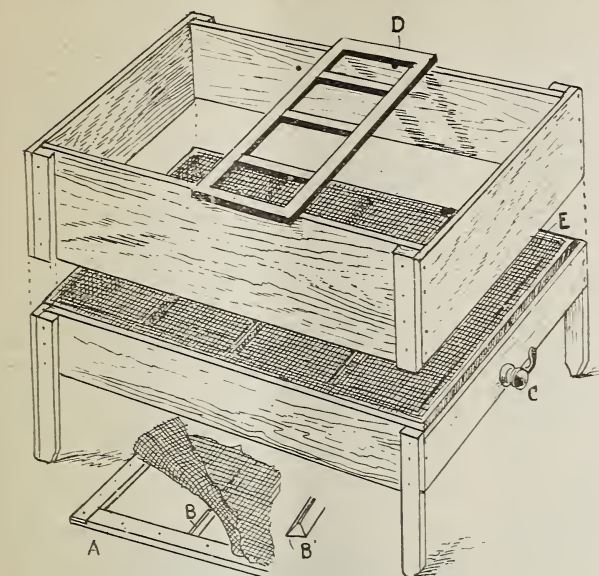


Fig. 1.—Upper and lower case, with screen E; rack D; gate C; A, section of wire-screen frame showing triangular braces B B.

inch strips to hold the frame in place. This frame is for frames to rest on while uncapping.

In operation draw the frame D to the end of the tank nearest the extractor, and uncup the first extracting-frame and drop it in the end of the tank, pushing resting-frame D along, and so on till you reach the other end of the tank. This distributes cappings

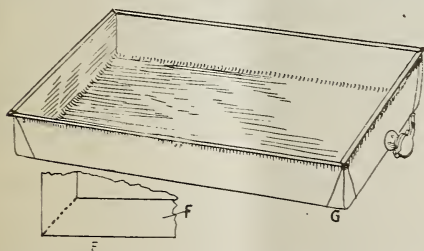


Fig. 2.—Galvanized tank of one piece; G, method of lapping the corners; F, flat metal showing how to clip corner before turning up.

evenly over the screen. Thus twelve or more frames may be uncapped and left to drip in the tank. When these are extracted, commence again.

If you wish to uncup more frames at one time, one or more supers may be placed on top to hold uncapped frames.

Now as to cost: The only part that needs to be paid for right out is the galvanized tank. Mine cost me \$1.90, complete with honey-gate. Then the wire cloth for screen will cost a few cents. All the other parts

apiaries and has to use the force-swarm method; and this is, the bees will build more worker comb after they are shaken off on to two half bodies, and the final removal of the lower half. I have had them build every comb of the ten used worker-cells; but more often the outside combs, and perhaps one or two more, would contain small corners of drone cells, which corners could easily be cut out and replaced with worker comb; whereas, by using the deep frames I had no end of drone-cells, besides the trouble of making the bees stay.

This question of making them stay after shaking off has troubled many bee-keepers besides myself a good deal formerly; but by close attention to details this trouble can be easily overcome. When I first practiced the shaking-off plan I would, as many do it to day, shake the bees off after they indicated their intention to swarm by depositing eggs in queen-cells. I thought I had no time to fool away. As a rule I had to hive them again the next day, and perhaps a few times more, thereby losing more time than if I had done it right at first.

The first instructions I had about shaking off bees, as given by Mr. Stachelhausen, plainly point out that the prospective swarm should be thoroughly aroused by smoking, and pounding on the hive, so that the bees will fill themselves with honey, just as they do before leaving the hive as a swarm. Is it any wonder the bees refuse to stay in an empty hive with a prospect of starving before them? It took me quite a while to find out that this arousing the bees was the most important point; and I find that many bee-keepers entirely overlook this, and therefore denounce the forced-swarm method as impracticable—the same as I reasoned not so very long ago.

But, to come back to the shallow-frame and hive question. I consider the use of the shallow hive as invaluable in the production of comb honey. After I reduce the hive to but one super, with every frame of the ten filled with brood, eggs, larvæ, the bees have simply no room for storage of honey, and therefore all has to go up into the sections. Plenty of bees hatch every day, so the queen has empty cells to lay in. This has to be closely watched, as the queen must be given room to lay in or she will swarm out.

Of course, this makes extra work; but who would not be willing to do a little extra work for a superful of nice honey? When the honey season draws to an end, the section supers must be taken off and shallow extracting-frames given for the bees to fill for winter or they will starve.

To sum it all up, the whole secret of success is not so much how you do things, but how *conscientiously* you do things—how much attention you pay to details. A very small item overlooked means failure, especially in comb honey production.

In closing this article I should like to ask the following question: Why do you not use white cottonwood for sections? This will

bend as readily as basswood, if not better; is cheaper, and more easily obtained along our great river bottoms. There is a certain kind just as white as basswood, and takes as good a finish, to my knowledge. As to four-piece sections, it seems to me that would be too much tinkering when you have to put from 6000 to 10,000 sections together at a time. The only advantage would be that a bee-keeper could make them himself with very little machinery.

Pomona, Cal.

[The idea of getting bees well filled with honey before shaking is important, and may account for the failures of some who may have overlooked it. The reader may read this article over very carefully, and some parts of it he had better "paste in his hat."]

Regarding sectional brood-chambers, if the truth were known we would find that very few who have given them a comparative test (I know of only one) have abandoned them. There is not enough cottonwood for section-making.—Ed.]



SWARMS WITH CLIPPED QUEENS; THE POPPLETON SULPHUR CURE FOR BEE PARALYSIS A SUCCESS.

I write to ask about clipping the wings of queens. I have only twenty colonies, so of course I can not afford to put in much of my time around them. During the swarming season, I look at them at noon when I come from the field to dinner, and then look at them again just before going to work. What would be the result if I should clip my queens, and they should swarm when I am not around?

My hives all rest on the ground with only a little piece of board under them.

Would you advise me to clip my queens under the circumstances?

I had three colonies affected with paralysis about three weeks ago, so I tried the sulphur remedy of Mr. O. O. Poppleton, page 796, Sept. 15, 1903.

I made a small bag of cheese-cloth, put about a heaping tablespoonful of sulphur into it, then took out two frames from the brood-chamber, shook the sulphur over them thoroughly, then shook the bag in the space left by them; slid the next frame along, shook between it and the next, and so on through the hive. I think every bee on the combs got a thorough dusting with the sulphur, and there was plenty on the combs for the bees that should come in from the fields. I then dusted the sulphur in

the entrance, and around the front of the hive on the ground. My bees seemed to be benefited immediately by the sulphur, very few dying after I gave it to them.

I suppose my plan takes a great deal more sulphur, but it saves a great deal of time, and the amount of extra sulphur used is of less value than the extra time saved in applying it.

A. B. JUDSON.

Escondido, Cal., Mar. 7.

[I would clip the wings of the queen and then follow the plan outlined by Geo. Shiber on page 441.—Ed.]

HOW TO PUT CANDIED CHUNK HONEY INTO MARKETABLE CONDITION.

I have 300 or 400 lbs. of chunk honey that has granulated, and is of dull sale at any price. Can I heat this hot enough to melt out the comb, and feed the honey back to the bees? Will it injure it by heating? Would you dilute it with water? Is not this honey more liable to start robbing than granulated sugar? My wish is to feed this honey at once before putting on surplus cases, so as to have them strong for the honey harvest.

J. W. MARTIN.

Greenwood Depot, Va., Mar. 31.

[The chunk honey that you refer to can be best treated with a very slow moderate heat. It should be set in a warm room back of the stove, where it will get a temperature of about 100 degrees or a little more, but be careful not to let it get warm enough to melt the wax. It may be necessary to put the honey in tin pails, and the pails in a wash-boiler of warm water heated to a temperature of about 110. This will cause the honey to melt, leaving the wax in its original shape. After the honey is all melted, drain off that portion which is free, and put the rest in a regular wax-press and squeeze the honey out. When it is drained clear, apply heat, and melt the wax. You will thus be enabled to get the honey free without spoiling its quality, at the same time getting the wax in marketable condition.—Ed.]

A SHORTER WAY THAN THE HEDDON SHORT WAY OF TRANSFERRING.

You advise, page 340, the Heddon short method of transferring. This seems to me a rather long way. Why not shorten it the way I have been doing with entire success? Fill the new hive with full sheets of foundation; give drawn-out comb if you have any, and it will work still better if you can put a little brood, even only a few cells full (of course unsealed) into the hive; but neither of the last two is absolutely necessary. Go to the hive to be transferred; remove it; put the new hive in its place; put on a queen-excluding honey board, then a reversed Porter escape-board without escape. Now drum the bees out of the box hive, the same as in the Heddon, then with saw and square make the bottom ends of the sides of the box hive perfectly square. Put the box hive

right side up over the hole in the bee-escape, then dump the bees out of the hiving-box in front of the new hive, and the job is done. In three or four weeks' time lift up the box hive; put a bee-escape into the board. Next day, take off the box-hive bee-escape, and honey-board, and put on super and hive-cover; cut out the combs from the box hive; extract what honey there may be in them, and melt out the wax.

I have found the foregoing the easiest and best; and the best time for my locality is the end of April or first of May. The hives so treated will seldom swarm, but give plenty of honey in sections, as these will be put on just at the commencement of clover.

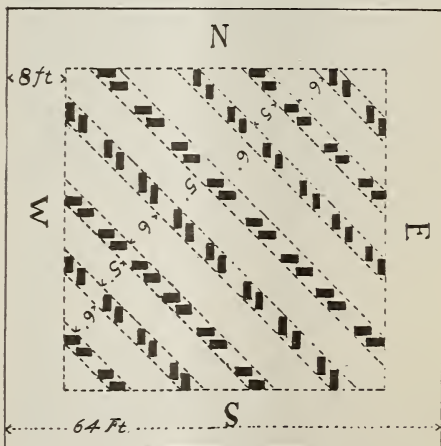
If you want to Italianize at the same time, sift out the old queen; give some comb with honey; let new queen and bees run in together, but for a day or two put on a cover and then place the box hive over the escape-board.

L. H. WILLMER.

Napoleon, Mo., Apr. 5.

ARRANGEMENT OF AN APIARY.

Mr. Editor:—I herewith hand you a crude drawing of what seems to me a very good arrangement for hives on a small plat of ground. The hives, as you will see, front east and south alternately, leaving a back alley between each pair of rows entirely free of bees. Hives set in pairs, on this



plat of 48 feet square, give a space of 4 feet between each pair of hives, and 8 feet from center to center of pairs. Eighty colonies can be provided for nicely in this way, on such a plat of ground. The alleys are wide enough for all practical purposes. I have tried many forms of placing hives, but I like this better than any other.

WM. M. WHITNEY.

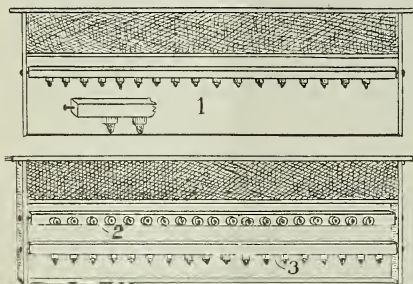
Lake Geneva, Wis., Feb. 9.

[One objection to having hives on the zig-zag or the cata-cornered plan is the difficulty of cutting down weeds or grass with scythe or lawn-mower, particularly the

latter. I think it was J. F. McIntyre, that extensive bee keeper of California, who once had zigzag rows; but when I visited him he had abandoned it and was using the straight-row rectangular plan.—Ed.]

A TILTING CELL-BAR.

I am pleased to see the articles on queen-rearing in GLEANINGS. Your journal grows better every year. I see they all set the frame down on the top-bar with the bottom-bar up, as you have it on page 20. I wish you would try my plan. When I was in the greatest hurry I would be sure to knock the frame over and break off some of the cells;



so I got a bottom-bar, cut it off just a little short of the one already in, and drove a nail through the center of each end-bar, and in the end of extra bottom bar so it can turn around—see Fig. 1. I lay the frame flat down on the bench I am working on; turn the extra bar so the flat side is up, ready for cells, as shown in Fig. 2. I fasten on the cells and do other work, and there is nothing to tip over. When the work is done I pick up the frame, turn the bar so the cells are down, and start for the hive.

Mayfield, O., Jan. 19. G. W. HAINES.

WINTERING IN THE CELLAR; VENTILATING THE HIVES AT THE TOP.

I notice in GLEANINGS, Feb. 1, an article on cellar wintering without ventilation, by Ira Barber. As I have had an experience of 53 years in bee-keeping, perhaps some words of mine in regard to ventilation and wintering bees might prove helpful suggestions to those of less years.

For 36 years I have wintered bees in the house-cellar, where I now live, with no ventilation during the cold weather up to about the first of March, except a five-inch stove-pipe hole in a chimney which goes to the cellar bottom. After that time, when the weather is warm we open the cellar windows during the night, to let in the cool night air, and close them during the day to make it dark, and keep out the warm air of the day.

Up to this writing, Feb. 8, they are very quiet, and I have over a hundred colonies in the cellar. I put them into winter quar-

ters about the last week in November, and take them out about the first of April. I too am in about 44½ north latitude.

An important factor to be considered is the ventilation of each bee hive at the top, also a small hole at the entrance.

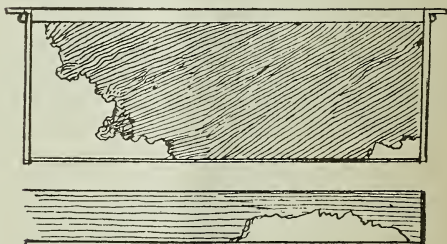
Newbury, Vermont. JAMES LANG.

[Your practice is to give ventilation, and plenty of it, when the bees need it; and even during mid-winter the chimney pipe changes the air—it *must* do so.—Ed.]

COCKROACHES OR FIELD-MICE.

Dear Bro. Root:—I feel a good deal disposed to say, "Why didn't you tell, if you knew?" and this is the matter. My three hives were left just where my good neighbor caught the swarms, in the grass under the orchard trees. When I made cursory examination of them in the fall the frames were so bound together with brace-combs that I dared not attempt to take them out. But I noticed a few stray cockroaches on the frames. I asked my friend (from whom I got the bees) about them; he said they did no harm. Not satisfied, I consulted the A B C book, and found no mention of cockroaches. So, while not wholly at ease on the matter, I did not investigate further at that time.

Ten days ago I brought two hives from town and set them in my back yard so that I could observe them. On weighing them, one weighed 27 lbs. I took advantage of a warm day to open up. On lifting out the division-board at the side, it proved to be literally covered with big cockroaches, and I was kept hopping with both feet trying to kill them as fast as they fell to the ground. Lifting out a couple of frames, the real state of the cause was manifest. The comb at



the lower rear end of all the frames was gnawed off about as I have tried to indicate; and the bottom of the hive, to a depth covering the bottom of the frames, and causing them to mildew, was a refuse of comb and dead bees. I moved all the frames and scooped out about a pint or more of this rubbish, killing as many cockroaches as I could get at.

Now, this happened to a strong hive, with some stores still remaining. The other hive that I brought to town was the one to which I introduced the queen last fall, spoiling two frames of stores in so doing. It weigh-

ed only 23 lbs., and I concluded that feeding should not be delayed. There were a few cockroaches visible on the frames; but the floor was as clean as could be desired. The strange thing to my mind is, why did the cockroaches thrive so in the strong hive? Could it be that they sheltered themselves behind the division-board? for in bungling the queen business I couldn't put back the board in that hive.

AUSTIN D. WOLFE.

[Under date of March 8, Mr. Wolfe adds:]

A little further light causes me to exonerate the cockroaches, and charge the mischief elsewhere. As I looked over the frames taken from that hive which was all "chewed up" (and this was done some days after the damage was discovered), the bottom strip of one of the frames was found gnawed in the shape indicated in the margin. I suppose field-mice took up their abode in the hive during the winter, and escaped without being seen after I had moved the hive to town.

Yesterday I observed that the soft maples are in blossom, and the air is vocal with the hum of bees. The two hives which I saved are at work finely, and there is a cloud of whitened bees over the pan of mingled rye and graham flour with which I baited them a day or two ago.

My aged acquaintance, Ed Lanbelin (better known in this vicinity as "French Joe"), said to me not long ago as I sat in his honey house, "An' Root, you can trade wid heem; I tell you, dat is one hones' man. Eef I buy an' sen' heem two cent too much, he sen' me postage stamp back." I was glad to hear the endorsement from the old fellow, 76 years old, but far from the kingdom.

AUSTIN D. WOLFE.

Parkville, Mo.

[Your second letter fully exonerates the cockroaches, and places the blame where it probably belongs—on the field-mice. The former are often referred to by our subscribers, but I do not remember to have seen any report where they did any serious damage; but mice, when they get into a hive, will soon work havoc with the combs. They like nothing better than a good warm hive to nest in.

Our artist has made your gnawed comb look as if it were made of a pine board. The reader will have to imagine that it is a real comb.—Ed.]

IMBEDDING WIRES WITH A NOTCHED NAIL-POINT PREVENTING FOUNDATION FROM BUCKLING.

For imbedding wires in foundation I use an eight-penny wire nail with a notch filed in the point. I lay the nail on the stove while I fix the foundation in the top-bar, and then lay the frame over a piece of board the size of the sheet of foundation so the wax lies flat and the wires touch it all along. Then I run the nail along the wires,

pressing them in a little. I worked in the kitchen evenings, and with the heat of the room and table-lamp the foundation was warm and limber. I never had any foundation buckle in the least. My neighbor worked in his cold barn, and his sheets buckled all out of shape. N. A. SPARHAWK.

Melrose, Mass., April 4.

[This same plan has been before advocated, but no heat was applied to the nail. The heat will, no doubt, improve the quality of the work.—Ed.]

FOUR BY FIVE PLAIN OR $4\frac{1}{4}$ BEEWAY SECTIONS; FRAMES WITH TOP AND BOTTOM BARS OF THE SAME WIDTH.

Dr. C. C. Miller:—As I expect to start an out-apiary soon, and, not being satisfied with the section that I am using, because of its being an odd size, I shall be highly pleased to have your advice as to which to adopt. I am thinking of using the plain $1\frac{3}{8} \times 4 \times 3$, with cleated separators (not fences), as I think there may be something in Mr. Dibbern's objection to them on page 184. I believe that you or I could glue the cleats to 500 separators in a day by making suitable forms for the work. If I don't use the above plain section, my next choice would be the universal standard, the beeway, $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$. Either of these will always be found in stock, and therefore cheaper than odd things like sections to nail, and quicker to put together. I noticed in your Straws that your present choice of a brood frame would be an unspaced hanging frame with top, end, and bottom bars all $1\frac{1}{8}$ wide. I can see excellent reason for that width in the top and end bars, which is, no burr pinning the brood-frames to the sections above nor to the ends of the hive, which the bees will do when the end-bars are only $\frac{7}{8}$; but I beg to ask your reason for making the bottom-bars that width. Please place yourself as free to adopt any style of brood-frame, brood-chamber, and section you choose, and advise as to your choice. D. C. COLEMAN.

Leavenworth, Kan., Feb. 22.

[Dr. Miller replies:]

You are certainly wise to avoid odd goods. As to preference for style of section, consult your market. If one kind sells for a higher price than the other, that has heavy weight. If market for each is the same, you will do well before entirely abandoning your present odd style to try both kinds side by side on a small scale, and see whether you can secure more pounds of honey with one than with the other, or the same number of pounds more easily with one than with the other.

It must be that I did not express myself clearly if I made the impression that I preferred unspaced hanging frames. I would not for a minute think of doing without automatic spacers for both side and end spacing.

I hesitated long before departing so far from the established fashion as to use a

bottom-bar same width as tops and ends, but I could see no reason why there should be any difference (do you?); and whatever reason there might be for a certain width for tops and ends applied equally to bottoms—less need for wide bottom-bars when they come down close to the bottom-board; but when there is a deep space under them, and especially when in an upper story, the wide bottom prevents building comb between. I have now no trouble whatever with burr-combs built between two stories of brood-frames. C. C. MILLER.

THE FOUL-BROOD LAW IN CALIFORNIA.

The prospects here are very flattering for a big honey crop, as we have had abundant rains since Feb. 5. In fact, it has rained almost every day during March. Bees are breeding up very fast; and if the weather continues warm they will commence swarming about Apr. 20.

In January, 1903, the legislature passed a foul brood law, whereby each county in the State, by petitioning the board of supervisors, is entitled to a foul brood inspector. But the law goes on to say that you must first establish the fact that foul-brood does exist, in the county in which you are desiring to circulate the petition. Here in this immediate vicinity we are free of it; but I have been informed that it is making headway in some of the surrounding counties, especially Santa Cruz.

If there are any parties knowing of its existence in Monterey or surrounding counties will they kindly communicate with me in the interests of the apicultural pursuits of this vicinity, with a view of having an inspector appointed that he may proceed at once to check the dread disease before it is too late? F. E. GAUSE.

Jolon, Cal., Mar. 30.

NOT ELECTRICITY NOR PHOSPHORESCENCE, BUT LIGHT REFLECTIONS; A REASON- ABLE EXPLANATION.

In regard to the phenomenon that W. S. H. speaks of, p. 289, I will say I do not think it was electricity or phosphorescence. I am of the opinion it was the reflection of light, although he says it was a dark night. But did he have no lantern with him, or were there no stars at all shining? What I do know to be a fact is, there is a spot about a bee's foot or leg that will reflect light equal to a diamond or crystals of sand or glass; but it can not be seen at all times. The light has got to strike them just so to get the reflection. The first time I ever noticed this was a few summers ago. One bright evening just before sundown the hive was facing the west; and as the bees were walking and twisting about on the alighting-board I saw those reflections of light, and it was a rather pretty sight to look at. I watched them for a while, although I have never noticed any thing of the kind after night; but I am of the opin-

ion that those sparkles of light, or reflections, could be seen from the light of a lantern or the stars if one were standing just right. Will Mr. W. S. H. write again, and tell us if he had a lantern with him or not? N. YOUNG.

Robertson, Ia.

A PLAN OF HANDLING SWARMS.

In answer to Mr. G. J. Sturm, p. 289, how to control swarming during the absence of the apiarist, I would say, clip the queen's wings, and one, two, or more days before a swarm is expected set the old colony to one side, then take an empty hive complete with top and bottom boards, and set it flat on the ground in the exact spot where the old colony stood with entrance the same way. Now place the old colony on top of the empty hive; and when the swarm comes out the queen drops down in front of the empty hive; and when the bees return, the queen crawls into the empty hive, and the bees follow. In the evening take the old colony to another stand. W. W. COOLIDGE.

Windsor, Wis., March 28.

[This plan is quite in line with the general practice of our most successful beekeepers. See also page 441.—Ed.]

BROKEN SECTION PIECES FOR NUMBER TAGS.

I find my way of numbering my hives very satisfactory. I send a sample. Most of us have some broken sections on hand. I put the numbers on with a stencil, and then,



having some varnish on hand, I went over the number with it. I doubt if this was of much advantage. I then dipped them in boiled oil. H. LANGTON JOHNSON.

Chilliwick, B. C., Jan. 14.

THE PRICE OF BEE-YARD HELP IN CALI- FORNIA.

Can you tell me about what wages an experienced apiarist could get in Texas or California? Could one get work the whole year? C. L. W.

Randolph, Vt., Apr. 4.

[I am not able to give you very definite information. Labor is higher in California than in the central part of this country; but I am under the impression that good help could be secured all the way from \$40 to \$60 a month. If board and washing were included, the price would be less in proportion, of course.—Ed.]



Let us not be weary (nor worried) in well doing; for in due season we shall reap if we faint not.—GAL. 6: 9.

Perhaps, friends, I am taking a little liberty in adding to a scripture text; but the words I have put in the parenthesis are by way of explanation—like a footnote, for instance; and my opinion is, although I am not a translator of Greek, that the word *wearyed* would include *worried*. And, by the way, what a beautiful text that is, any way! We often admire great speakers or writers for their skill in putting grand thoughts into few words; but has there ever been a writer or speaker since the world began who could put more thought into a few simple words or phrases than Paul, the great apostle to the gentiles? The words of my text are an illustration of that fact—let us not be *weary* in well doing. Many times when our friends meet with discouragements and repeated losses we try to say something encouraging. We often say, after expressing our sympathy, “Do not take it to heart too much. You probably will have better luck next time.” Or, “It is a long lane that has no turning,” and many such expressions. But just compare all these words of sympathy and encouragement, coming from the average person, with the thought in our text. The man who has lost his house and home, and may be his wife and loved ones, may have been an earnest, honest hard worker. It does seem as if some people were especially unfortunate; but our text says to such, first, do not think of giving up your principles and industrious habits. Keep on, and, even though you have slurs and jeers cast at your past integrity, hold fast to your faith in God. And then how beautifully worded is the promise—in due season, perhaps not right away! May be there is more bad luck, as the world puts it, still in store for you; but if you just keep on, and hold fast to your faith, you *will* reap your reward. The condition of this reward is that you do not become faint-hearted nor get it into your head that there is no use in trying so *hard*, any longer, to do *right*.

Just day before yesterday these words came into my mind like sweet music. I repeated them over and over, mentally, and it sent a thrill through me every time. It seemed to stand out beyond all other Bible texts and promises. It seemed like a bright star on the face of the heavens. Once in a while these beautiful scripture promises come to me in just that way. It seems as if their meaning and hopefulness were illumined by the Holy Spirit; and such revelations come to me oftenest when I am giving up my own plans and projects, and working for something else or for somebody else. And now if you will listen I will try to tell

the little story of what brought this text to mind.

Last fall I sold off the last of my greenhouses. For the first time in many years I did not have any plants to work with and to pet and love during the whole winter. Along in February I felt as if I could stand it no longer. I subscribed again for two floral journals and built a little greenhouse; but I shall have to tell you in another department about that greenhouse that was built in winter.

Monday morning, April 11, I was out in this little greenhouse when the sun was just coming up. I had planned quite a number of improvements and work to be done among my pets. I had my breakfast quite early so I might finish before my *regular* business in the factory. Just then Ernest came in hurriedly to say that he was wanted at Columbus immediately in reference to the Brannock local option bill then pending. He said there were particular reasons why *he* could not leave home, and added:

“Now, father, I want you to go in my place. You can look after what is to be done, may be, better than I can; and it will be in the service of the State, just at a time when the influence of every good temperance man is needed.”

To tell the truth, I did not want to go a bit. I have been traveling around quite a little lately, and I wanted to stay at home. Besides, I dreaded pushing myself into the presence of public men, especially the bright young law-makers of Ohio. I am not enough of a politician to keep posted even in the affairs of the State and nation. I knew I should expose my ignorance at every turn; and then came a feeling such as I have mentioned when I wrote about my Sunday-school class and the flying machine—that I was getting to be too old to be of much account; my influence would not count very far, any way, etc. I mention this, dear friends, because I am persuaded that all elderly people have similar temptations. Of course, there is such a thing as pride in trying to show people how smart you are, etc.; and I confess that, in my younger day, I had a good deal of pride and ambition; but, thank God, that has all gone by now. Whenever I can do any good, however, for my State or nation, I hope I am ready to do it. God knows I do not relish pushing myself forward.

I hastily gave directions to one of our boys to take care of the greenhouse until I returned, and then was off on the train. At the depot I met our Representative for this district, and was pleasantly surprised to find him so ready and so glad to tell me all about the temperance work in the House, and the prospects of the Brannock bill in the Senate; and when I left him it was with a feeling that, if we had many more clean, bright, honest, scholarly men like him among our Representatives, we might thank God and feel hopeful over the State of Ohio.

When I met our attorney for the Anti-saloon League in Columbus I was again surprised to find *him* so glad to see me. In a little time I was introduced to members of the House and Senate who were foremost in pushing our temperance laws. Perhaps I might mention here that, when the bill went through the House, there were 72 votes for it and 36 against it. When it came up before the Senate there was a tremendous determination on the part of the brewers and saloon-keepers to block its passage. Unfortunately, Governor Herrick seemed to be on the side of the wets—at least he announced publicly and privately that the bill was not fair. This was a profound surprise and a deep regret, not only to temperance people but to the press generally throughout our State. Let me digress a little.

When I approached the Hayden building I inquired of a bright, clean looking, middle-aged man if he could direct me to the rooms of the Anti-saloon League. He replied, "They are on the sixth floor. As I am going right up there I will gladly direct you."

As the elevator started he said, "You are one of the temperance folks, I take it."

"I sincerely *hope* I am. Are not you one also?"

"Why, yes; I believe in temperance to a reasonable extent."

"Well, my friend, is it not a 'reasonable extent' to ask that the *majority* may rule?"

"Why, I suppose so. But you temperance people want the whole earth."

I was astonished at this, but I tried to hold him down to my point, and I replied again:

"But, my good friend, is it not according to the spirit of the institutions of our country that we should *have* the whole earth if the *majority* is on our side?"

He looked so bright, intelligent, so gentlemanly, and so well educated, that I believed him to be reasonable; but I had evidently provoked him without meaning to, for he replied:

"Yes, yes; I know you folks got a big victory through the House, but it was by fraud and unfair means.* Now, I occasionally want a drink of beer myself; but I do not want to be obliged to go half a mile after it."

By this time we were up at the top. He

* As there may be those among our readers who take the position that this man did, please let us consider it a little. It would be quite reasonable to suppose that the brewers might stoop to fraud or unfair means. They are after the money—nobody disputes that; but those who are working for *temperance* are quite a different sort of people. First, they are a class that would be very unlikely to be willing to use fraud or any thing unfair. Second there is no *money* in it for us at all. The temperance cause means money out of pocket, and that continually. I hope it is true that our ambitions and our aims are above those of a sordid nature. We are using our strength and our money to protect our wives and our children that our boys and our girls may grow up intell gent, God fearing men and women. And yet this man looked me in the face and charged us with gaining our victory by "fraud." It was a revelation to me, especially to find a bright, well-educated man give utterance to such logic.

courteously pointed me to the Anti-saloon rooms, and his natural good breeding prevented him from showing an uncivil spirit. It seemed to me, however, that this conversation gave me a key to the situation. There are a good many rather nice people in Ohio who do not relish the idea of letting the majority rule when it comes to blocking the way toward their accustomed drinks.

It was one of my happy surprises to find such a nice lot of clean men, not only in the House but in the Senate. Some eight or ten years ago I made a similar visit to Columbus on a like errand. At that time the whisky element seemed to have the upper hand almost everywhere. I said again and again in my heart, "May God be praised for the new order of things." The men who had been elected by the people of Ohio, both in the House and Senate, were, as a rule, not only temperate but temperance men; and, I think I may truthfully add, gentlemen and scholars besides. Mr. Fisher, the Representative from this county, seemed to be a pretty fair sample of all the rest. When I asked Ernest what had happened to make such a change in the management of our State, he replied, "Why, that is the work of the Anti-saloon League, the W. C. T. U., and other temperance organizations. The Anti-saloon League has especially *declared* that no man who favors the saloons or the liquor-traffic shall get a place among our law-makers, and they are just beginning to make themselves feared."

Tuesday afternoon, about three o'clock, the fight was opened. The champion of the temperance people was Senator Chamberlain, of Lorain Co. As my hearing is a little defective I got in early and chose a position on the seats saved for the audience, pretty near the speaker's stand. In doing this I did not notice I was quite near Senator Chamberlain's desk. I had shaken hands with him before dinner; but owing to the confusion incident to being introduced to so many different men, all of them bright, clean (and, I think I can safely say, *good-looking*), I could hardly remember one from another. As the session opened, Senator C., looking round, caught sight of me, and gave me a pleasant smile of recognition. Now, I did not know who it was until I happened to notice his name on his desk. He probably saw my look of embarrassment, and watched my face while I slowly caught on to the fact that he was the one I was most interested in—our advocate. Let me digress a little right here.

I have several times spoken of the wonderful power there is in a *woman's* smile. I have mentioned its dangerous power for evil, contrasting its power for good in uplifting humanity. When I was a younger man I sometimes almost feared the power of a woman's smile—that is, if a real smart bright woman should set seriously about showing me what she could do. And now I wish to say something about the power and uplift that may come from a pleasant nod of recognition from a fine-looking *man*.

I have somehow got the notion into my head that Senator Chamberlain is a good-looking man. May be it is just my notion, but I think his *wife* will agree with me, even if others do not. Well, if he had been a nice young woman instead of a nice young man, and had given me such a smile as that, I do not know but I should have been "worried" a little for fear I was not exactly loyal to Mrs. Root in being so much pleased over such a simple thing.

After a long delay, and after we were all tired out by other matters and preliminaries, the President of the Senate announced the Brannock bill. When Senator C. first came, right after dinner, he was happy and smiling; but just as the Brannock bill was called I noticed he looked pretty sober. Attorney Wayne B. Wheeler, who sat just over the railing, near him, also looked rather sober, and I thought both seemed to be a good deal worried. The brewers had given up trying to overpower us in *votes*, but their next best thing was to kill the effect of the bill by various amendments. Another bright young Senator across the room sprang to his feet and began. He first announced he was a friend of temperance, and particularly a friend of this local-option bill. He talked so well that it was hard to believe he was *not* in very truth what he claimed to be. But when he brought out his amendments I very soon decided that his purpose was to get us "rattled" and into trouble if he could. This man, Senator Oskamp, is one of the brightest young lawyers I ever listened to. Nothing could embarrass him. He never got mixed up nor tangled, and he was as cool and deliberate as if he had the whole world right under the tips of his fingers. I could not help admiring him, even while I feared his logic. It had been decided by the temperance forces, for the sake of peace, to accept some of the amendments that would not hinder us very much, and Oskamp soon got the temperance Senator into a tangle. The President of the Senate himself declared one of the motions was, in his opinion, out of order. I tried with all my might and mental strength to grasp all the points of the situation, and to keep it clear in my head; but I got all mixed up. Senator Chamberlain was evidently somewhat put out and embarrassed also. Let me say right here that the President of the Senate was one of the finest presiding officers I ever met in my life. It rejoiced my heart to know that we had so able a man in Ohio to preside over such an important gathering. It evidently would require a little time for the temperance people to clear up their position.

Just here I began to pray most fervently for our cause; and my prayer seemed answered when the President announced that, *to save time*, they would go on and vote on the motion while the clerk looked up and straightened the matter, where he thought Mr. Chamberlain was out of order. In a few moments he announced with a pleasant smile that Senator Chamberlain was all

right. Then they went on with the contest. For a time a part of the amendments were accepted by vote, and the champions of the brewers were becoming encouraged. Then the enemy made a mistake. They had such a great string of amendments the honest men among the Senators began to be suspicious, and the *noes* became more frequent. Oskamp kept on, however, presenting his amendments until there was a call for the "question" from all sides of the House. The whole body of Senators began to be impatient until it got to be the fashion to greet each new amendment with continual *noes*; and when *no* got to be the *fashion*, every amendment offered was rejected. It reminded me of a flock of sheep. After we had got the enemy on the run it was an easy job, apparently, to keep them going. The final decision was 27 in favor of temperance to only 6 against it—a wonderful triumph. Perhaps I might say it was an unexpected triumph.

It is a very hard thing indeed for me to sit from half past twelve till half-past six without leaving my seat. The room was densely crowded with men and women who were friends of temperance. In fact, the papers say it was the most crowded session of the season. It is very hard for me of late to sit very long in a crowded audience. When I was younger I could stand it for a brief season better than I can now. At half-past three I felt as if I should have to leave the room; but when I became thoroughly interested in the legal contest over the matter of saloons or no saloons in the residence districts of our State, I forgot my fatigue. After the little embarrassment I mentioned at the outset, I began praying that the Holy Spirit would move on the hearts of our Senators and guide them aright. When it came to voting, of course I could not vote; but, thank God, I *could* pray, and that most earnestly, for the voters. As the clerk called the names I prayed briefly, as the names were announced, that every answer might be *no*. Some of the Senators were undecided, and the clerk had to call their names twice before they made up their minds. At such times I prayed most vehemently—of course mentally—that the good brother might be influenced to say *no* instead of *yes*; and it seemed to me as if all who hesitated finally said *no*. Now, please do not fear, dear friends, that I am getting to be superstitious. The good Book says, "The effectual fervent prayer of a righteous man availeth much." That does not exactly come in here; but if the inspired writer had said, "Even the prayers of *blundering sinners* avail much," there might have been some hope that my prayers were doing some good. I do not know but some of the friends who have more confidence in hypnotism than your humble servant may suggest that the Senate was hypnotized into giving us this great temperance victory. To which I reply that I never before heard of hypnotism being used for any good purpose. If it really *has*

come in so as to help us banish the saloons, I shall have more faith in it than I ever had before. I think we can all agree in this: That the presence of a large number of people, especially people of influence, *does* have, and always *will* have, its effect on our law-makers.

When Ernest wanted me to go to Columbus, and be on hand during the passage of this bill through the Senate. I could not believe my presence would do any good; but when the people of our State or any other State are so much interested in the framing of good laws that they will leave their work and be on hand when these bills come before the legislature, there is a much better prospect that such bills will be passed. Senator Chamberlain did not look toward me, nor smile, until his repeated calls for "question" had resulted in the calling of the names for the final vote, and then we had our victory. Then he turned to me and gave me *another* bright happy look, like the one I have described. As soon as I could get hold of his hand I repeated the words of our text, something like this: "Dear Bro. C., be not *weary* (nor *worried*) in well doing; for in due season you *shall* reap if you faint not." He had been *wearied*, and, if I am correct, greatly *worried*, with the unceasing, persistent importunity of the enemies of the bill in trying to break it down, amend it or nullify it; but he held on and came out victorious. Somebody said to Bro. Wheeler just then, who was close to us, "Now, Bro. Wheeler, you can get some sleep, I suppose, and rest up for the next battle."

Permit me to mention incidentally that, just before the temperance bill was acted on, when I was tired, stupid, and perhaps half asleep, I thought somebody mentioned something that sounded like "foul brood." Then I heard the words "contagious disease." There was no excitement prevailing just then, and the Senators did not talk as loud as they did a little later when they got on to temperance. Then another Senator got up and remonstrated. Said he, "Why, this is a matter that concerns only a few persons. We can not afford to tax our State to further their wishes when only a few are to be benefited, or have any concern in the matter at all."

The first Senator who arose to his feet said, in substance: "Why, gentlemen, this is a contagious disease. It threatens to ruin the honey industry of the State. You say it is a matter of little moment; but I tell you I have received more letters in regard to this matter than any other bill that has come before the Senate."

Then he held up a great bundle of letters. Three or four others arose to their feet, and said, "And I," "And I," "And I." Notwithstanding, there was quite a number of Senators who did not vote at all. Out of 35, 17 were for the passage of the bill, and 3 were against it. Now, here is a big moral. On p. 276, March 15, Ernest put in an editorial, urging the writing of these

letters; and this editorial, friends, was the means of securing this very just bill for the benefit of the bee-keepers of Ohio.

Before closing I wish to say that some of the best temperance talks I ever heard in my life came from the Ohio Senators at this session. Senator Carson, of Xenia, is a host in himself. He is not only an eloquent and fearless speaker, but he is one of the clear-headed reasoners it was ever my privilege to listen to.

Later, April 20.—The above was dictated something over a week ago. Since then, to the astonishment and indignation of all the good people of Ohio, and almost the entire press, Governor Herrick, by threatening to veto the Brannock bill, induced the House to make concessions that have probably stripped this righteous law of perhaps half its force. Protests were showered in upon him from all over the State; but he defended himself by some sort of plea to the effect that such a temperance bill would ruin the Republican party, and so he pushed on in his course. It reminds me vividly of the celebrated Griggs nullification act; and it ought to be a reminder to all of us that that old spirit of carrying the day in politics by any means, fair or foul, has not yet passed by. The entire House and Senate are composed of good men, almost without exception, and everybody supposed the victory was complete. While I write, loud are the protests, coupled with some threats that the Governor's political life is finished. May be, however, there is providence in it. The nullification act I have alluded to roused up the churches; and the temperance people of Ohio are awakened to a fighting spirit now as they have never been before. The brewers and saloonists may be congratulating themselves that they have won a victory; but I think they are mistaken. Our excellent temperance advocate, the Cleveland *Leader*, suggests to the saloon element that it behooves them now to keep very quiet, and be careful how they rouse any further an indignant majority—indignant because just one man prevented the majority from ruling. For this reason the *Leader* suggests it would be good policy for them to give way very quietly without suits at law or any other protest when any community demands the abolition of grogeries.

Still later.—The Brannock bill is now a law, and is doing work. We take the following from the Cleveland *Leader* of April 20:

The much-talked-of Brannock bill is now a law, Governor Herrick having signed it to-day. Representative Brannock, whose name the bill bears, sent down a new gold pen for the Governor to use in signing. Mr. Brannock thus got a prize souvenir. Ohio people can now begin to clear saloons out of residence districts. To Columbus citizens will probably go the distinction of being the first to take advantage of the law. To-night 62 citizens of the north end of the city surrounding the Ohio State University, a residence section with about 1900 voters, started out to get signatures for the petition for a local-option election. They felt sure of getting the required 40 per cent of the voters by midnight, and expect at election to wipe out the 11 saloons from the neighborhood.

To which I want to add, may the Lord be

praised! and may the good work keep marching on!



AN AUTOMATIC GREENHOUSE.

One reason for selling out my old greenhouse was the expense of caring for them, especially when I was absent. Unless heat is turned on and off, the ventilators opened and closed, and somebody has personal supervision, in almost any sort of greenhouse the stuff may go to ruin very quickly. If the ventilators are left open at night during a freeze, damage will be done. If they are left closed in the middle of the day—perhaps the very day after the frost—damage will be done again, by over-heating.* On this account I decided to give up my greenhouse and the work I loved so much; but, as I told you, along in February, when we had bright sunny days suggestive of spring, I felt as if I could not stand it without a place where I could see things grow, flowers unfold, etc. So I set about making an *automatic* greenhouse, or as near it as possible.

Peter Henderson, in one of his books, tells about a greenhouse that was constructed over a large cellar or basement. The man who constructed the basement afterward decided not to build, so he put a greenhouse on top of it, with a floor made of open slats. The air in the basement was constantly equalizing the air above, under the glass, so as to correct the tendency to get either very hot or very cold; and the experiment succeeded well with hardy plants, without any heat except that from the sun.

I have before mentioned that we have under the floors of our home a large basement warmed by exhaust steam, and hot-water pipes connected with radiators above. This basement is always warm—often so warm that we have to open the outside windows to cool it off a little. Well, I constructed a lean-to greenhouse on the east side, with two good-sized windows opening into it, from the large basement mentioned. This lean-to is only about 8×20 inside. This gives two outside beds of 3 ft. each, and a 2-ft. walk between them. In order to keep it as warm as possible, the beds are solid level with the ground outside, and the 2-ft. walk is simply the 2 ft.-wide trench cut 3 ft. into the ground. To keep the ground from caving in at the sides, I used roofing-slats, so there is nothing to rot

*Just at this present time, when competent labor is so scarce, everybody is studying to get what he wants done, without much expensive help. A man who can care for a greenhouse, and will *remember* to care for it, costs money. With a little private affair one can not expect a man to stay in the greenhouse all day long. He must have other work somewhere. But the average man, when he gets busily engaged in this "other work," will, as a rule, forget his greenhouse.

or give way. This steampipe—or, rather, sewer-pipe—that carries the steam under ground runs across one end of it. This ground being always hot, we use this end of the house for colei and other plants that like lots of heat. I wanted to cut a door through from the cellar into my 2-ft. path so I could have access during stormy weather, without going outdoors. Mrs. Root has not yet, however, given me *permission* (?) to do so; but I think I can bring her around to my way of thinking after a while. She objects on the ground that the greenhouse may some time be taken away, and then there will be an unsightly opening in the stone wall. Of course, this doorway would equalize the air in the greenhouse with that in the cellar still more perfectly.* The glass is double thick, A quality, 12 inches square. The rafters or sash-bars are of cypress, 2×2½ inches. They are rather heavy, but I wanted them to reach nearly 10 feet without any middle supports, for reasons mentioned later on. The glass was slid in grooves, without any putty, butted together, of course; and I now have the most perfect roof overhead I ever had in any greenhouse. The slope is about 3 ft. in the length of the 10 foot rafter; and there is not a particle of drip, and hardly a crack where you could push in a sheet of writing-paper. When ordering the glass I explained what it was for, and told them it must be cut exactly square. When the boxes were opened I found a slip of paper saying if there was a light in the lot that was not perfect in cutting and in quality I should let them know. The glass came from the Diamond Glass Co., Cleveland, O.

Now, it is usual for florists to whitewash the glass, say some time in April, when the sun gets to be very hot. I do not like this whitewash. Early in the spring it is a detriment, and it is also a detriment on cloudy days and all winter long and mornings and evenings. The appearance of a greenhouse is always marred, in my estimation, by being daubed with whitewash or any similar preparation. Now, here is what I did: I went to the store and got the largest and strongest curtain-fixtures I could find. But even these were not of sufficient length; so I spliced them with a round stick of exact-

*Most of us have found out that very few plants do well in a room heated with a furnace or radiator. The air is too dry. I have had to move our house-plants into the kitchen, where they had the benefit of damp air from the tea-kettle in order to have them do well. A good greenhouse should have a damp atmosphere a greater part of the time. If we open the ventilators when there is a cold north wind, this wind damages tender stuff, and drives the moisture from the air and soil. I decided long ago that some method of keeping down the temperature during sunny days, *besides* opening the ventilators, would be a great desideratum, and now I have it. As a rule, all the ventilation our greenh. use gets is through those two windows that open into the basement mentioned; and this basement, being under ground, is always more or less damp. The air that comes through the outside windows, before getting into the greenhouse, is warmed in passing the steam-pipes in the basement. This warm basement keeps *up* the temperature during cool nights, and keeps the temperature *down* during sunny days, and at all times sends a rather damp atmosphere into the greenhouse.

ly the size of the curtain roller. The splice was made by driving the wooden roller into a tin tube about a foot long, the two wooden rollers meeting in the middle of the tube. Then I used cheese-cloth for curtains. Two curtains, about 9 ft. wide, shade the ground. When the sun becomes too hot you simply grasp the pole at the bottom of the curtain, pull it down to the eaves, and hook it on a couple of nails. In the afternoon, when the dwelling shades the greenhouse, the pole is loosened and the spring in the curtain-fixure rolls it up in a jiffy. To work curtains in this way there must be no posts nor supports under the rafters. Now my greenhouse works beautifully; in fact, the whole arrangement has been a bigger success than I often have. It is now full of flowering plants; and about all the attention required is watering. Of course, it is better to manipulate the curtains so as to give the plants the full sun mornings and evenings; but if Mrs. Root and I both want to be away, the curtains can be left down permanently for a day or two. In this case but little watering would be needed. To get rid of frequent watering as much as possible I have adopted the following plan:

The plants are all in pots. These pots are plunged into the soil of the beds, not only to the rims, but a little deeper. The soil is all good potting soil, made of old well-rotted manure so that it will break up fine, with the proper amount of sand, some bone meal, ashes, or soot from the chimneys, some swamp muck, etc. This is easily worked and dug. To plunge a pot, I use an iron spoon, such as they generally use in the kitchen for a basting-spoon. The edges are made very sharp with a file. This spoon makes a tip-top post-hole digger, if you will excuse the term; and I do believe a large steel spoon with a handle like that of a common auger would be a splendid thing to dig post-holes. With this spoon I can make a hole for a pot very quickly.

Now, one great reason why plants do not thrive is a lack of drainage. Every pot should have at the bottom broken crockery, or, better still, lumps of soot from the chimney, broken-up coals from the stove, or something of that sort. I prefer the charcoal or soot, as it is lighter than the broken crockery, and possesses more or less fertility. For very small pots, use just a little moss. Now, plants need air as well as water and fertility. They must have air to do their best; therefore I take my iron spoon and make a hole a little lower than the pot is to go. The spoon is pointed, you know. This leaves a cavity under the bottom of the pot; and if you should neglect your pot so your plant gets pot-bound, it will send a lot of white roots down into this cavity.

The above may not be a new invention, but it is a wonderful invention for me with my own greenhouse. Plunge the pots down to their rims, or a little more, so that you can rake the soft soil right over them; then give the whole bed a good watering. The cavity under the pots will prevent injury to

the plants from "wet feet." I should have mentioned that, in making up the beds, drain-tiles every two feet not only gives perfect drainage, but the tiles allow air to work all through the soil, and up into these cavities I have mentioned, left under each pot. You will now readily see that plants potted and plunged in this way are not apt to suffer from drouth, even though they are neglected for several days. Plants in full bloom, or loaded with bloom, of course require more water; but the arrangement answers beyond my expectations for avoiding the necessity of daily supervision. I expect to give you some pictures of both outside and inside, later on. This morning there are 18 petunias in full bloom, and 2 specimens of *azalea amollis* just coming into bloom. There are about a dozen different roses, a wilderness of beauties in the way of primulas, geraniums, some pelargoniums just coming out; fuchsias, ageratums, lantanas, genestas, vincas, sweet alyssum, and a great variety of gorgeous coleis, of all colors of the rainbow. The hot end, where the steam-pipes go through the wall, while it would kill some of the plants, it is just the thing for coleus to a dot. Some golden-leaved salvias, contrasting with the glittering scarlet acharanthus, set off the whole as a sort of background.

Do you say all these things cost money? Well, almost all the plants I have mentioned cost from 3 to 5 cents each. Those from cuttings, still less. The azaleas cost from 20 to 35 cents each.

Now, there is just one more thing about that greenhouse that makes it not only a thing of beauty, but a joy for ever. Every evening I have a great lot of papers and periodicals to look over—perhaps half a bushel basketful. If I do not get through with them and get them into the waste-basket, they pile up in my secretory until it will not shut up. Then Mrs. Root scolds. Perhaps I might add she never scolds so but that she is always ready to give me a kiss. In fact, it is a sort of compact between us in our married life, that, whatever comes up, we can always "make up" at any instant. Well, after I have read my periodicals for a couple of hours my blood becomes stagnant, and I get to feeling dull. It is that feeling that prompted me to build that greenhouse. I wanted something to get to work at evenings—something for a change or recess after this reading that I really must do to keep pace with the business of the great world.

Now I will tell you what I do when I get tired and stiff from too much reading. There is an electric light that I can hook over one of the rafters in any part of the greenhouse. With this light turned on I can mellow the soil among my plants, lift out those that are becoming pot-bound, sweep up, watch plant growth, and do any thing else. The only trouble is, if I get down to the greenhouse I get so busy (and happy) that Mrs. Root can not get me to stop when it is bedtime.

By the way, I can note changes in thrifty plants in just one hour. If I get a new plant that has been pretty badly used by mail or express, I can tell in just one hour whether it is going to grow or not. With this lean to greenhouse, my plants are constantly turning toward the sun or light, especially the bed that is back against the wall. Well, a plant that has taken hold, and is going to grow, will commence turning its leaves perceptibly toward the light in just one hour. Why, it seems as if my pets could really talk to me. This morning, when I looked in and saw the new petunias that had opened during the night in their gaudy dresses, it seemed as if each one were saying, "Mr. Root! Mr. Root! please look at me! A'n't I pretty?" And

then another and another would say the same thing. None of them said, "A'n't I the prettiest of all, or more handsome than any of my neighbors?" They just said, "Don't you think I am pretty? Don't you admire me in my new spring dress?" And then if I do not say it out loud I say it in my heart, "Yes, you dear little darlings, you are *wonderfully* pretty; and I thank God from the bottom of my heart for having sent you to give me these thrills of joy."

Dear reader, if you have not something about your own home—flowers or trees or a little garden, or something else to make your life in a like manner happy, and full of thanksgiving to God, you are not getting all the joy and happiness that God intended you should have in this world of ours.

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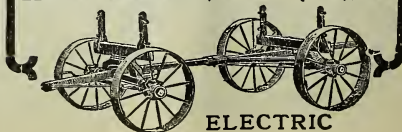
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